JOURNAL

OF THE

FRANKLIN INSTITUTE

OF THE

State of Pennsylvania,

DEVOTED TO THE

MECHANIC ARTS, MANUFACTURES, GENERAL SCIENCE,

AND THE RECORDING OF

AMERICAN AND OTHER PATENTED INVENTIONS.

JULY, 1835.

Engraving on Wood.

(SEE VIGNETTE.)

We present the readers of the Journal with a wood-cut, engraved by our fellow member, Mr. Reuben S. Gilbert, of this city, representing a scene taken from Burns' celebrated poem of "Tam O'Shanter," and copied from an engraving of Thomas Landseer's.

In a former number, (vol. x., p. 145,) we presented to our subscribers a beautiful specimen of medal ruling, which has excited much admiration, both at home and abroad; and we hope hereafter to offer further illustrations of the condition of the arts in our country.

Few persons, except artists, can *fully* appreciate the merits of this engraving as a specimen of the art, but it will, we apprehend, be generally conceded, that the entire performance will bear a strict comparison with the best European efforts in the same style.

The story which this cut is intended to illustrate, is too well known to our readers to need a description of the action of the piece, with the merit of the composition of which we have, besides, at present, no concern. Our object is to call attention to the engraving as a specimen of the art, and to the full enjoyment of it, in this point of view, the subject matter is unessential. COM. PUB.

On the comparative Corrosion of Iron, Copper, Zinc, &c., by a saturated solution of common salt. By A. D. BACHE, Prof. of Nat. Philos. and Chem., Univ. Penn.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—An inquiry was addressed to me some months since, by Mr. Joseph S. Walter, Jr., in relation to the material which would be most proper to be used for pipes to convey a strong solution of common salt to a pump intended to raise it, and for the material of the pump itself. From this solution it was intended to recrystallize the salt. The circumstances being of a somewhat complex character, I determined not to be satisfied with the indications of general theory, but to try the experiment, under the circumstances of the case, as nearly as might be possible. The materials in relation to which inquiry was particularly directed, were iron, copper, brass, lead, and zinc. Of these, the rapid oxidation of iron, when exposed to a solution of common salt, is well known; the corrosion of copper by sea-water is also well known; the influence of the earthy muriates contained in the ocean prevents this case, otherwise very closely resembling that in question, from corresponding precisely to it, the common salt referred to containing these muriates only as impurities. Zinc does not decompose water readily, and oxidates very slowly, even when exposed to the combined action of air and moisture; it also ranks below sodium in the list of electro-positive metals; its chloride, however, is soluble. Lead is readily acted upon by the combined agencies of air and water, first oxidating, and then passing to the state of a carbonate; its place in the list of positive electrics is below zinc, and, of course, below sodium, which latter we should expect, therefore, to have the greater affinity for chlorine; the protoxide of lead, however, and several of its salts, interchange elements with chloride of sodium. The chloride of lead is insoluble, and hence the presence of soluble muriates acts as a protection against the corrosion of lead by water.

As the experimental results directly obtained may possibly prove of value to others than the estimable individual for whom they were to be applied, I have thought it right to put them on record.

The materials used were iron, copper, brass, lead, and zinc, the metals being as presented in commerce, and, therefore, probably not quite pure. They were prepared in rectangular plates, about two and a half inches in length, and three-fourths of an inch in width, and varied in thickness from .03 to .07 of an inch. These were placed in glasses containing saturated solutions of common salt, rather less than one-fourth of an inch in depth from the top of each plate being left exposed to the air. The vessels were left uncovered, and the evaporation of the water of the solutions was supplied from time to time during the exposure. The temperature in the room in which the vessels were placed, was not very different from 50° Fahr. during any part of the time.

After an exposure of about three weeks, the plates were removed from the solutions, and carefully washed and dried. Having been weighed before placing them in the solutions, they were now again weighed, and the loss of weight ascertained.

The iron plate was found covered with oxide of iron, strongly ad-

hering to it in part, and in part deposited at the bottom of the glass containing the solution. There was upon the upper plate, and in the glass, a deposit of proto-chloride (white) of copper, coloured by carbonate of copper, and a similar deposit upon the brass plate. The lead and zinc had been, to all appearance, very slightly acted upon; there was upon the latter a white deposit, probably of oxide of zinc.

The following table shows the amount of surface actually exposed to the solutions, the weight of the entire plates, and the loss of weight by the exposure. I have not reduced the weights used to grains, because the object is merely to obtain comparative results.

Material exposed.	Surface exposed.	Weight of plate.	Loss of weight.
Name.	Sq. inch.	Grammes	Grammes
Iron,	4.656	6.320	.312
Copper,	3.936	10.720	.058
Brass,	4.138	5.150	.029
Zinc,	4.572	6.115	.003
Lead,	4.762	20.080	.013

From the foregoing data I have calculated, below, the loss of weight, in grains, which a surface of forty square inches, or a plate of twenty inches on each surface, and very thin, of the materials would have suffered, and the relative loss by each material, referring to that which lost least, namely, the zinc, as the standard of comparison.

Material.	Loss of weight by 40 sq. inches of surface.	Compara. loss by exposure of same surface.
Name.	Grains.	Ratio.
Zinc,	0.40	1.00
Lead,	1.68	4.20
Brass,	4.31	10.78
Copper,	9.07	22.68
Iron,	41.27	103.18

The corrosion of the iron, with the same extent of surface as zinc, and exposed to a solution of common salt for the same length of time, is thus shown to be upwards of one hundred times that of the zinc. The zinc appears to protect the copper in the brass, probably by rendering it electro-negative, and thus diminishing the affinity of the chlorine, which would otherwise destroy the copper.

Since the experiments indicate zinc and lead as the materials to be selected from those named, on account of the slight corrosion which they suffer, lead would obviously have been the material selected for the pipes to conduct the solution of salt to the pump, and zinc for the material of the pump, the selection depending upon well known properties of these metals.

The coatings formed upon both the lead and zinc, would protect the underlaying surface from action, unless removed by mechanical force.

First Report of the Joint Committee of the American Philosophical Society, and Franklin Institute, on Meteorology.

The Joint Committee of the American Philosophical Society, and the Franklin Institute of the State of Pennsylvania, return thanks for valuable meteorological journals, received from the following gentlemen.

Mr. R. H. Gardiner, Gardiner, Maine.
Mr. Jacob Mull, U. S. Navy, Portsmouth, New Hampshire.
Mr. James Porter Hart, Farmington, Mass.
Professor Caswell, Providence, R. I.
Mr. A. W. Smith, Middletown, Conn.
Mr. Edward Gibbons, Lockport, N. Y.
Mr. C. Gill, Flushing, Long Island.
Dr. R. H. Rose, Silver Lake, Pa.
Dr. Henry Gibbons, Wilmington, Del.
Dr. G. S. Sproston, U. S. Navy, Baltimore, Md.
Dr. J. M. Foltz, U. S. Navy, Washington city, D. C.
Prof. James Hamilton, Nashville, Tenn.
Dr. John Locke, Cincinnati, Ohio.
Mr. J. Panglos, Urbana, Ohio.

Only four months have elapsed since the reception of the earliest of these journals, and already some valuable facts have been deduced from a comparison of the simultaneous observations which they contain.

A detailed report of all general conclusions, with the data on which they are founded, will be given hereafter; but as this will require a considerable length of time, and a much more extensive collation of journals than the committee have yet in their possession, they will mention, with a view to increase the zeal of their correspondents, one or two facts, which, from further observations, will probably lead to important general laws.

In all the great fluctuations of the barometer which occurred in January and February, at Nashville, Tenn. they were one day sooner than at Philadelphia; and on the 22d of March, the barometer was lowest at Philadelphia at 3 o'clock, P. M.; whereas, at Providence, R. I., it continued to fall till 9 o'clock, P. M., as very particularly noted by Professor Caswell. The exact moment of greatest depression at Portsmouth is not given by Mr. Mull, but it was lower there at 7 o'clock, P. M. on the 23d, than on the 22d at sunset; at which time it had already risen more than half an inch at Philadelphia.

Do these barometric fluctuations of great magnitude travel north-eastwardly?

Again, on the 22d of March, at the moment when the barometer was lowest at Philadelphia, the wind at York, Pa., at Flushing, N. Y., at Middletown, Conn., at Providence, R. I., and at Portsmouth, N. H., was blowing towards Philadelphia violently, especially at York and Portsmouth, while at Philadelphia it was a perfect calm. There was also, on that day, a very violent rain at York, and in

Berks county, Pa., and at Baltimore, and also a considerable rain at Flushing, Middletown, and Providence, at the same time, when there was a calm in Philadelphia, and no rain; and as this state of things continued for many hours, it seems probable that the air, which moved with great rapidity towards Philadelphia, in opposite directions, must have ascended over Philadelphia, and passed off above even with greater rapidity than it approached below, or otherwise the barometer must have risen, in a very short time, to a great height, by the conflicting impulse of these two opposite currents; but the barometer stood all this time more than three-quarters of an inch lower than usual.

The committee desire these remarks to be viewed as they are intended, to be confirmed or rejected as future observations, and a more extensive induction, shall warrant. They merely propose the queries:

Are rains caused by an upward motion of air, commencing where the dew-point is highest, or where the barometer is lowest?

Do storms in the temperate zones generally travel from some westerly point? And are those storms which so travel preceded by an easterly wind, and also followed by a westerly, unless another storm is soon to come on in the same direction? In the torrid zone, do the storms on the north side of the line travel towards the north-west, and on the south side of the line towards the south-west?

On the 29th of January, from 8 o'clock, A. M. till 4 o'clock, P. M. there fell at Nashville, Tenn., 1.47 inches of rain. This storm travelled east, and it began to rain at Cincinnati at half-past 12 o'clock, and at Philadelphia at 4 o'clock next morning, the 30th; it rained hard all day, terminating at 7 o'clock, P. M. During this whole day, the wind at Nashville and Cincinnati blew towards Philadelphia, and at Flushing, Middletown, Providence, and Portsmouth, directly towards Philadelphia also. This storm lasted eight hours at Nashville, fifteen hours at Philadelphia, twenty-four hours at Flushing, and twenty-seven hours at Portsmouth. The wind set in at all these places some hours before the rain from the north-east, and at the termination of the rain changed to the south-west; and before it ceased raining at Portsmouth, the wind had changed round by south to west at Flushing and Philadelphia, and to the south-west at Middletown.

Even one well authenticated case of this kind goes far to establish the fact that the wind below blows towards the centre of a *great* rain. From the time of the middle of the storm at Nashville, until the middle of the storm at Philadelphia, was $23\frac{1}{2}$ hours, and this corresponds well with the fluctuations of the barometer mentioned before.

It may be mentioned also, that, reckoning from middle to middle of the storm, it was $30\frac{1}{2}$ hours from Nashville to Middletown, and $32\frac{1}{2}$ from Nashville to Portsmouth. These all agree in giving a velocity to this storm of about twenty-six miles an hour. *Is this the velocity of the upper current of air at Philadelphia, which comes generally from a point south of west? Is it this upper current which gives direction to the storms in this latitude?*

Many instances have been observed upon a momentary breaking of the lower clouds, in the very middle of these north-east storms, when the clouds above were coming from the south-west.

This storm had a north-east and south-west diameter, at Nashville, of about 200 miles, gradually increasing in size, until, at Portsmouth, it was 800 miles. Its north-west and south-east diameter is unknown.

What are these two diameters of storms generally?

Our correspondents will perceive that something on this subject is likely to be discovered by a persevering course of simultaneous observations over our wide extended continent. The Joint Committee which now addresses you will spare no means to elicit from your observations, decisive answers to the queries proposed above, and, if possible, to establish such general laws as will entitle meteorology to the name of science.

To this end, it is essential that the original observations, and not the mean of several, should be communicated, and that the number and extent of our correspondents should be increased; we therefore request each one of our correspondents to procure at least two more. It would be very desirable to have different correspondents at places along our northern frontier, and others on our sea-board, from Cape May to Cuba. Also to have some correspondents in the *far west;* we have none at present farther than Nashville.

The committee earnestly request that the present opportunity of discovery may not be lost, that the undertaking may not languish for want of zeal; their correspondents may be assured, even when the committee is silent, that they are constantly at their posts, waiting for the communications with that intense interest which always accompanies sanguine hopes of successful investigation.

JAMES P. ESPY, *Chairman Joint Committee.*

CHARLES N. BANCKER,
GOUVERNEUR EMERSON, M. D. } *Com. of Amer. Philos. Soc.*
ALEXANDER D. BACHE,

JAMES P. ESPY,
ALEXANDER D. BACHE,
HENRY D. ROGERS, } *Committee of Franklin Institute.*
SEARS C. WALKER,
PAUL B. GODDARD, M. D.

Medals to be awarded by the Royal Society, for Discoveries in Physical and Mathematical Knowledge.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—In pursuance of the directions of the American Philosphical Society, I send to you, for publication, the accompanying copy of a letter from the Foreign Secretary of the Royal Society of London.

Respectfully, yours,

A. D. BACHE,
One of the Secretaries Am. Philos. Soc.

ROYAL SOCIETY OF LONDON,
Somerset House, March 1st, 1835.

SIR,—I am directed by his Royal Highness, the President, and Council, to acquaint you, for the information of the American Philosophical Society of Philadelphia, that his Majesty, the King, has been pleased to grant two gold medals, of the value of fifty guineas each, to be awarded by the Royal Society, on the day of their anniversary meeting in each succeeding year, for the most important discoveries in any one principal branch of physical and mathematical knowledge.

His Majesty having graciously expressed a wish that scientific men of all nations should be invited to afford the aid of their talents and researches, I am accordingly directed by the Council to announce to you, sir, that the royal medals for 1837 will be awarded in that year, the one to the author of the best paper to be entitled, "Contributions towards a System of Geological Chronology, founded on an examination of Fossil Remains, and their attendant phenomena,"—the other, to the author of the most important unpublished paper in physics, which may have been communicated to the Royal Society, for insertion in their Transactions, after the present date, and prior to the month of June, in the year 1837. In case no paper on the geological subject above specified, or none possessing sufficient merit, is communicated to the Society for insertion in their Transactions, after the present date, and prior to the month of June of 1837, the Council propose to adjudicate one of the royal medals of that year to the author of the best paper on any other subject in geology, or mineralogy, that may have been presented for insertion in the Philosophical Transactions, within the same period previous to the time of award.

I have the honour to be, Yours, &c.

CHARLES KONIG,
For. Sec. R. S.

FRANKLIN INSTITUTE.

Monthly Conversation Meeting.

The seventh conversation meeting of the Institute, for the season, was held at their Hall, April 23d, 1835.

Mr. Thomas Ewbank, of New York, exhibited a series of experiments on the rarefaction produced in the air within a tube, by blowing through another tube inserted into the first; the tubes were variously connected, and proportioned in dimensions, and the degree of rarefaction produced in each was measured by the rise of a column of water into the tube.

Mr. Ewbank showed that this principle might be applied conveniently to syphons, the flow of water through them being commenced by blowing through a lateral tube. He also exhibited a syphon, the shorter leg of which terminated in a tube, widening as it receded from the bend, and which was filled by stopping the longer leg with the finger, and immersing the other leg of the syphon in a liquid; on

the removal of the finger, the momentum of the liquid carried it up the shorter leg, passing the bend.

Messrs. Lehman & Duval, of Philadelphia, exhibited various specimens of lithography, drawn and printed at their establishment.

Prof. W. R. Johnson showed an apparatus intended to illustrate the principle upon which rockets ascend, and to show that such ascent might take place in vacuo, and, therefore, could not be produced by the reaction of the gas, issuing from the rocket upon the air without. The apparatus consisted of two revolving arms, with opposite apertures, like those of Barker's mill; this was placed in an exhausted receiver, and set in motion by admitting air through the apertures into the receiver. The arms were furnished with broad wings, presenting a large surface to resist the motion through air. The velocity was perceived to be greater, as the vacuum was more perfect.

COMMITTEE ON SCIENCE AND THE ARTS.

Report on Messrs. Little & Elmer's Chronometer.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, a Chronometer, constructed on a plan invented by Messrs. Little & Elmer, of Bridgeton, Cumberland county, New Jersey, REPORT:—

The following description is given by Mr. Little, one of the inventors.

To Mr. W. H. C. RIGGS:

Sir,—Your letter of the 9th instant was duly received. I would cheerfully furnish you with a copy of the specification; it is somewhat lengthy, and refers to the drawings, on which account, perhaps, it would be more satisfactory for you to take the chronometer to pieces. You will perceive that all the escapement, except the escape wheel, is attached to the upper plate; and if you put in the balance, I think it cannot fail to be understood, as then all that is new will be clearly and distinctly seen. I would suggest that you notice that the train is lower than the train of the common chronometer; consequently, more power is carried to the balance, with the same maintaining power.

My seconds wheel has	60	ratio 5.
Escape wheel pinion,	12	
Escape wheel,	12	

which gives 60 impulsations in a minute, and four semi-vibrations for one impulsation; consequently, the balance stands detached double the space of time.

Common Chronometer.

Seconds wheel,	80	ratio 8.
Escape wheel pinion,	10	
Escape wheel,	15	

which gives 120 impulsations in a minute, and two semi-vibrations for one impulsation. Both trains make 14,400 semi-vibrations in one hour.

It is well known to practical men, that there is great difficulty in making the locking spring; if too strong, it takes too much power from the balance, and is liable to derange its natural scale of forces; if too weak, it is liable to be destroyed, and requires the greatest address in the workman to make it safe. In mine, the unlocking is performed by a compound lever, which enables me to make the spring more easily and perfectly safe; consequently, this escapement (although it has more pieces) is more easily made, and more safe than the common chronometer escapement; the spring is to the balance what gravity is to the pendulum, and, like the pendulum, the balance has a natural scale of forces, which must be more or less disturbed at every impulsation. In my escapement, the impulse is given at every second, whereas, in the common chronometer, the impulse is given twice in a second, and, in some, five times in two seconds; consequently, my balance stands detached more than twice as long as the common chronometer, and the scale of forces is less frequently deranged. That the arcs of the four semi-vibrations will differ in their lengths, is certain, but they are periodical every second; consequently, the seconds will be isochronal among themselves. You are at liberty to take the chonometer to pieces, and lay this communication before the committee. As the inventor and maker of this escapement, I have written this in my own name.

I am, &c.

ARCHIBALD LITTLE.

By permission of Messrs. Little & Elmer, the committee examined the instrument submitted to them in detached parts, to ascertain whatever was new in its construction. They considered the workmanship of the whole instrument as highly creditable to Messrs. Little & Elmer, and pronounced their opinion without hesitation, that chronometers on the plan of that submitted to them, might be made to keep excellent time. The escapement was evidently original, and very ingeniously constructed. It does away with some of the inconveniences common to all other escapements; but, while it removes some of the difficulties that interfere with the perfection of chronometers, it introduces others, which the committee apprehend are nearly, or quite, as formidable.

Messrs. Little & Elmer's statements of the number of impulses are correct; but there is no reason to think that the moving power is diminished, and it is questionable whether the jarring of the chronometer is less, from having this power communicated by *half* the number of impulses. Moreover, a new wheel is introduced, and the danger of variation of rate from a variation of friction, is thereby increased.

A statement of the rates of No. 2, during the months of March, April, and part of May, is herewith submitted.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

Report on Messrs. M'Mullin & Hollon's Knitting Machine.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, a machine for knitting stockings, invented by Messrs. M'Mullin & Hollin, of Sinking Valley, Huntingdon county, Pennsylvania, REPORT:—

That the model submitted for their examination consists of a frame about one cubic foot in dimensions, a sliding bar, or carriage, in length somewhat greater than the breadth of the intended fabric, lying along the front of the frame. An axle, or shaft, parallel to, and back of, the carriage, from which the several motions are derived, extends across, and is supported in opposite sides of, the frame. On the upper side of the carriage, along its whole length, and pointing upwards, is a row of teeth, or comb, to receive the loops of the stitches as they are formed.

The movements of this machine are simple, consisting merely in a short motion of the carriage at every stitch, whilst the thread is carried forward and back, so that, passing the tooth on its foremost side in going forward, and behind it on its return, it laps the thread around it, and in throwing off the previous loop, to form the stitch; also, in a contrivance for reversing the motion of the carriage at the edge of the work. All of which are derived from the shaft above mentioned.

There is some difficulty in describing the parts employed in forming the stitch, without reference to drawings. The principle, however, is the same as that of the common hand knitting, a single row of loops remaining always on the comb, and the operation proceeding from loop to loop, as they are presented in succession across the end of the work, the thread being first lapped around above the loop, when the loop is taken up by a small hook, and carried over the top of the tooth, and dropped on the other side, which completes the stitch, the lap of thread being prevented from slipping off the tooth, by a very short hook on the end. The hook which throws off the loop, is made to descend until its point is presented under the loop, when it again rises, retreating a little from the top of the comb, to avoid the upper thread, and the top of the tooth, when it is clear above the tooth; it then advances a little forward of it, at the same time leaning or tumbling forward until it drops the loop, and then returns to its place.

The work proceeds from side to side with great rapidity, and reverses its motion at the proper time. This change takes place when the carriage has advanced far enough to bring a check piece (which it carries with it) into contact with a shifting side cam, on the middle of the shaft, immediately back of the knitting hook.

The check piece is movable at the will of the operator, for the purpose of varying the width of the work, according to the intended shape. It has an arm, reaching forward to shift the position of the finger, or thread bearer, as it is brought up against it at the end of the motion, and is lodged against a tooth of the comb.

The movement of the carriage is caused by the before mentioned side cam, operating successively upon the teeth of a rack attached to the carriage, and is either towards the right hand, or the left, according to the position of the cam, which is reversed as it arrives at either end of its journey.

The advantages of this machine, as set forth by the inventor, are, the use of *power* in propelling; the employment of *children* to attend their operation; and greater facility in shaping the work, besides producing firmer and more even fabrics.

The committee consider the invention to be creditable to the author, and important to the public, being ingenious and simple in its construction, and possessing some, if not all, of the advantages anticipated by its inventor.

Being thus favourably impressed, the committee beg leave to recommend to the Managers of the Franklin Institute, to award to Mr. John M'Mullen, a premium of twenty dollars, and a medal from the Scott legacy fund.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

May 14*th*, 1835.

Report on Holcomb's Reflecting Telescopes.

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination, two reflecting telescopes, made by Mr. Amasa Holcomb, of Southwick, Hampden county, Massachusetts, REPORT:—

That the following description of these telescopes is given by Mr. Holcomb:

The two reflecting telescopes now submitted by the subscriber, are constructed on the plan of Sir William Herschel, having the front view. The largest has a focal length of $9\frac{1}{2}$ feet; the diameter of the speculum is $8\frac{1}{2}$ inches, and has five astronomical eye-pieces, and one terrestrial eye-piece, for showing objects erect; the lowest power is 57, the highest 900. The smallest has a focal length of 7 feet 9 inches; the diameter of the speculum is $6\frac{1}{2}$ inches, and has one terrestrial, and four astronomical, eye-pieces; the lowest power is 60, the highest is 600. They are of the same kind as those that were submitted a year ago, except the manner of mounting, which is very different.

AMASA HOLCOMB.

On the evening of the 4th of May, the committee met, by appointment, in an open lot south of the Pennsylvania Hospital, for the purpose of testing the performance of the telescopes, which had previously been tried by some of the members of the committee, and by other gentlemen, on the evening of the 2d. The result of the examination was highly creditable to Mr. Holcomb, and cannot fail to gratify all who have at heart the advancement of astronomical science in this country.

The instruments, with powers varying from 50 to 600 in the small-

er, and to 900 in the larger, gave satisfactory views of the moon with a sufficiency of light.

Mr. Holcomb's ability to manufacture telescopes which should bear a comparison, on favourable terms, with the best four and five feet achromatics now in the country, having been established by the report of the committee in May, 1834, their attention was chiefly directed to ascertaining the degree of perfection to which he has attained in his art, by his persevering efforts during the past year. Accordingly, the remarks which follow are made with reference to the larger telescope, of about ten feet focal length, eight inches aperture, and with a positive eye-piece, giving a power of about 900, and the surface of the field of view nearly twice as great as that of a Gregorian, and one-third greater than that of an achromatic telescope, under similar circumstances.

The view of the moon with its rugged surface, its ridges of mountains, and the endless variety of indentations on its surface, was interesting beyond description, and exceeded any thing of the kind the committee have ever witnessed.

Saturn's ring, though not in a favourable position, was seen manifestly double, for the first time in this country, as far as the information of the committee extends.

The companion of Polaris appeared as a star of the fourth or fifth magnitude, to the unassisted eye.

The double stars, Castor, μ Draconis, 4 and 5 ϵ Lyræ, and 44 Bootes, were distinctly separated, and the dark space between them made evident. The last mentioned, consisting of two stars of the fifth magnitude, distant 3″ made a fine appearance; they were soft, and well defined, and there were no scattering rays of light, as was the case with Castor, in both instruments.

A class of closer double stars, of which 6 Coronæ, distant 1″.2., and ζ Bootes, distant 1″.4., may serve as examples, was acknowledged by the artist, last year, to be too difficult for his telescope. This has furnished a stimulus for his exertions, and the complete division of the latter, as witnessed by the committee on the present occasion, has been the reward of his disinterested labours. The discs of the two stars in ζ Bootes appeared to be tangent to each other. The committee have no evidence that the same has been effected by any other telescope in the country.

For the purpose of finding the limit to the power of Mr. Holcomb's telescope, the committee called his attention to a class of still closer stars; among them were mentioned, ζ Cancri, μ^2 Bootes, κ Coronæ, 36 Andromedæ, and ϵ Arietis, the last of which is only divisible by two telescopes now in use, viz: the Dorpat telescope, and the twenty foot reflector of Sir John Herschel. These stars, distant from 0″.6. to 1″.0., are made to appear with their discs tangent to each other in those celebrated instruments, as appears by their notes appended to the observations contained in their printed catalogues. It is almost needless to add, that Mr. Holcomb acknowledged these stars to be too difficult for any teiescopes he has yet made.

It may seem presumptuous to compare the small instrument of

Holcomb with the chefs d'œuvre of British and German genius; but, thanks to the admirable labours of the Herschels, of Struve, and of South, observers are enabled, through their printed catalogues, to compare together the optical capacities of their telescopes in distant regions. Accordingly, it appears from an examination of these catalogues, and of Holcomb's instruments, that what the best telescopes in Europe can do upon stars distant 0″.6., can be done upon stars distant 1″.4., by instruments which are the work of an unassisted, and almost neglected, American optician.

Judging from the progress made in his art, by Mr. Holcomb, during the past year, the committee look forward, with confident expectation, to the not far distant period, when, should his health be spared, the country will be in possession of a twenty feet reflector, of native workmanship, rivalling the best European instruments, and that, too, without the patronage of any corporate institution, should all of them be willing to waive the opportunity of sharing with him the merit of such an enterprise.

The committee have been led to enlarge upon this subject, from a knowledge that one of our national institutions has, within a few years, imported into the country, at an expense of $2,500, a telescope which, though excellent in its kind, is inferior to that exhibited by Mr. Holcomb, which was made and mounted to order for an individual in Georgia, at less than the eighth part of the above mentioned sum. It is not probable that a twenty foot instrument from Mr. Holcomb, would cost eight times as much as one of the length of ten feet.

The mode of mounting the instrument appears to be original, and nothing can exceed it in simplicity, or steadiness. Indeed, with a power of 900, no inconvenience was perceived from resting with one hand on the frame, and another on the tube, although the same could not be done with the mounting used by Mr. Holcomb last year, or with that of common achromatics with a power of 200, without serious inconvenience.

In conclusion, the committee beg leave to recommend Mr. Holcomb to the Board of Managers of the Franklin Institute, as a candidate for a premium and medal from the Scott's legacy fund, for his new mode of mounting reflecting telescopes.

By order of the committee.

WILLIAM HAMILTON, *Actuary.*

May 14th, 1835.

COMMITTEE ON PREMIUMS AND EXHIBITIONS.

Report of Experiments made by request of the Committee on Premiums and Exhibitions, on Bene Seed Oil, furnished at the eighth Exhibition of the Franklin Institute, by Wetherill & Brothers.

In November, 1833, several bottles of bene seed oil were furnished the Committee on Premiums and Exhibitions, with a view to have determined, by experiments, the value of this article in the manufacture of wool, and particularly for painting in and out doors work, as

a substitute for linseed oil. The following are the reports made by those to whom this oil was furnished for experiment.

Experiments on its Use in Manufacturing Wool. By GEORGE WALL.

The bottle of bene seed oil received for the purpose of essaying its usefulness in the manufacture of wool, has been tested as far as practicable with so small a quantity, being necessarily confined to a small lot of a particular kind of wool.

It was put on a lot of fine merino wool, which has considerable animal oil in it; this I thought not unfavourable to a full experiment, and particularly in respect to the glutinous substance which it was thought to contain, and which is, perhaps, the only objection which the manufacturer will find against its use. The quantity of this oil used was the same as that of sperm, or olive, for the same quantity of wool.

The only object of using oil in the manufacture of wool, is to make it work more freely in the carding and spinning; and those who performed that part of the work, are of the opinion that it worked as freely as that oiled with good sperm, or olive oil. In the process of extracting the oil from the cloth, or scouring, as it is usually called, it was found that this oil required more expense of materials and labour than the oils commonly used by manufacturers; this is a strong evidence that it contains more glutinous matter, which would be highly objectionable in the manufacture of some kinds of cloth, and particularly those of delicate colours, as the process of scouring would be very likely to injure them; but where the extra expense is the only objection, as it would be in the manufacture of many kinds of goods, it must be considered of minor importance.

After carefully observing all the different operations, from the wool to the cloth, and examining it in all its different stages, I am inclined to believe that this oil will answer a valuable purpose in the manufacture of many kinds of woollen goods, but I cannot speak with entire confidence without testing it in a larger quantity, and on different kinds of wool.

Philadelphia, April 15th, 1834.

Experiments, by M. SHOVE.

Having received a small quantity of vegetable oil, I have endeavoured to ascertain its effects on wool, in the various operations of manufacturing.

I have ever deemed it desirable, in the application of oil on wool, that it should spread itself thinly over the surface, so that, if possible, every fibre should have an exceedingly small portion; the vegetable oil sent us appeared to do so about as well as summer strained sperm oil.

So far as relates to the operation of carding, I should think it might answer for coarse wool, provided it was used immediately after being applied, but when suffered to remain several days, a crusty

envelope seems to form, which is very detrimental in the process of carding.

Whether a greater portion of this oil is absorbed, or exhaled, than sperm, I know not; but the circumstance of the crusty formation is still more prejudicial in the process of spinning than in carding, or in any other operation.

It evidently appeared to me that this oil was more difficult to discharge than sperm oil, requiring more and stronger soap—consequently, more expense.

The peculiar smell of this oil seems to be retained after scouring; as this would be an insuperable objection to its use, I took particular pains in this respect, and thus, after repeated scourings, found that the wool was not divested of the odour, which is something similar to that of linseed oil.

Being mixed in about equal parts with lamp oil, I could not discover, in burning, any perceptible difference in the light, but thought it consumed a little faster; I was not positive, however, in this respect, as it was not marked precisely, and I had not enough left to make another trial.

I regret that the result did not prove as favourable as the sanguine wishes and hopes of the friends of American industry and improvement could desire.

Experiments on the Use of Bene Seed Oil, in Painting on Out Door Work. By CHARLES WETHERILL, *and* J. G. HARKER.

In November, 1833, J. G. Harker had a post in his yard painted, part with bene seed, and part with linseed, oil; at present, both present the same appearance; both dried quickly.

In the early part of October, 1834, J. G. Harker had other out door painting done with the oil of bene; on this occasion, the paint was mixed and prepared for painting by C. Wetherill, who, with a view to ascertain its drying property, mixed the paint without the usual quantity of drying. The paint was laid on the work on Saturday evening, and although it rained previously to Monday, it was dry on that day, and now looks well; and from every opinion, upon close examination, we do believe that this oil will answer a valuable purpose for out door work.

The report on greasing wool and machinery, we believe, is before the Committee of the Franklin Institute.

AMERICAN PATENTS.

LIST OF AMERICAN PATENTS WHICH ISSUED IN DECEMBER, 1834,

With Remarks and Exemplifications, by the Editor.

1. For a *Screw for Propelling Canal, and other Boats;* William Burk, Whitemarsh, Montgomery county, Pennsylvania, December 2.

The specification of this patent is, very properly, quite brief, for

as the thing patented has, in numerous instances, obtained the same sanction, and many descriptions of it are to be found in the files of the office, it would have been a waste of words to have repeated the whole story in all its longitude.

"The machine is on the principle of a screw, the worm, or thread, as it may be termed, being made to wind round a small shaft, one, two, three, or more times, as will best suit the motions of the machine. The size of the screw to be regulated by the size of the boat. The machine is intended to be applied to either end, or both ends, or both sides, or in the middle, of the boats intended to be propelled. This machine has an advantage over all others as to facility, and passing through the water with the least agitation." So says the patentee, but if we are to be guided by the result of experiment, repeatedly made, we shall be compelled to pronounce it to be one of the least efficient of all the plans tried. Who was the first inventor, we have not sought to learn, but it was patented in this country as long since as 1815, if not earlier, and there is a full description of the same thing in the "Annals of Philosophy" for 1818, vol. xi., p. 138.

Were our canals and rivers filled with some semi-fluid, having a good portion of tenacity, these screw propellers might travel onward without scattering or communicating a rotary motion to it, as they do to water, whilst the boats to which they have been attached, have advanced with no more than a snail-like speed.

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2. For *Saw Mill Dogs;* Phineas Bennet, Hector, Tompkins county, New York, December 2.

Although this patent is taken for saw mill dogs, we do not find any thing new in the description of this part of the appendage to the saw mill, the contrivance described consisting in a mode of setting the log by the working of a pinion in a toothed rack fixed upon the head block. The shaft upon which the pinion is placed is to be turned by a lever, and has on it also a ratchet wheel, on which the lever acts. A method of rendering the apparatus self-acting, is described and represented, but there is not any claim made, and we are consequently left entirely to conjecture respecting what part of the contrivance the patentee considers as of his invention.

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3. For an improvement on the *Movable Sinks,* invented and used in Paris; Peter Barthlemy, city of New York. An alien, who has declared his intention to become a citizen of the United States; December 2.

This is an invention dedicated to Cloacina, a goddess to whom temples are erected even in christian lands, but whose rites are generally performed in secret, and alone. Whether or not the patentee has really improved upon the Parisian mode of conducting them, is a question the discussion of which we shall postpone, and that probably *sine die.*

4. For machinery for *Sifting and Cleaning Grain, &c.;* Martin N. Armstrong, and William H. King, city of New York, December 2.

Were all the specifications in the Patent Office drawn up in the style of that before us, we should be compelled either to relinquish the task of examining their contents, or of purchasing a right to some literary winnowing machine, which would separate a grain of wheat from a bushel of chaff, if any such there be. We have conned over the eighteen pages of the aforesaid specification, and are still unable to tell what is said upon the subject; but we have learnt that the said machine consists of a cylindrical screen, and certain other contrivances for effecting the proposed object. The cylindrical screen, placed like a bolter, is double, containing one wire work cylinder within another, and within the inner cylinder a fan, furnished with four wings, or vanes, the shaft of which is in the axis of the two cylinders, and which fan is to revolve in a direction the reverse of that of the cylinders. The grain, or berries, &c. &c. operated upon, are, after being subjected to the action of this screen, to pass into a riddle, or vibrating box, worked by cranks, where the heavier and lighter bodies are to be separated from each other by a centrifugal, combined with a vibratory, motion.

There are separate claims made to the respective parts of the apparatus which are brought successively into operation, but we have spent so much time in gleaning a few scattered ideas from the "full, clear, and exact" description, that we have none to spare for epitomizing, and examining into the validity of the claims made.

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5. For a machine for *Moulding Brick;* William C. Grimes, York, York county, Pennsylvania, December 2.

(See specification.)

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6. For a machine for *Pressing Brick;* William C. Grimes, York, York county, Pennsylvania, December 2.

(See specification.)

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7. For a *Spring Carry-all;* Frederick Shelton, Jackson, Northampton county, Pennsylvania, December 2.

There is much complexity about this carry-all, and much obscurity about the description of it; and although it is very well represented in the drawing, we are unable, from the whole, to discover the intention of the patentee. We perceive, however, that it derives its name of spring carry-all, from its having four springs, like those of a pole lathe, which extend along under the roof of the carriage, having on their vibrating ends, crank rods, or pitmen, which descend down, and are operated upon by cranks upon the shafts of the wheels, each of which has two, one near each end; these springs are, we presume, to aid the motion of the wheels, by their action on the cranks, which stand at right angles to each other; the wisdom of this contrivance is equalled, if not surpassed, by another, which is certainly quite novel.

The bottom of the carry-all is to have a trap-door, or opening, in the middle, to give the driver an opportunity of walking on the road, whilst the roof is still over his head to protect him from the inclemency of the weather. There are some other improvements described, the whole of which exhibit the same degree of Archimedian talent with those already noticed.

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8. For an improvement in the machinery for manufacturing *Wrought Nails and Spikes;* Henry Burden, Troy, Rensselaer county, New York, December 2.

This patent is taken for improvements on a machine invented by Mr. Burden, and patented on the 26th of May, 1825. The improvements consist in the manner of forming and using the heading dies, a full explanation of which would require a reference to the description and drawing of the original machine. One of the improvements, it will be seen by the subjoined claims, consists in substituting chilled cast iron for steel, in a part of the dies, these having been found to wear longer, and being easily replaced.

"What I claim as my invention, is the method of forming the heads of the nails, or spikes, in a steel box, as above described. I would here also remark, that, no matter whether the box be made of cast iron, or other metal, whether in two or more pieces, whether formed in part of the dies, &c. &c., so long as the chamber, or hole, is so constructed as to admit the header to play tight, and at the same time freely, similar to the piston of a pump, or steam engine. Secondly, I claim as my invention, the use of cast iron side steels, chilled on their edges, as described above, in lieu of their being made of steel, as described in my specification of May, 1825. My claim extends to what is commonly called *cast iron*, no matter how it is hardened, although I prefer chilling or hardening it in a cast iron block."

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9. For machinery for *Doubling, Twisting, Reeling, &c.;* Samuel M'Cauley, Flattston, Beaver county, Pennsylvania, December 2.

This machine the inventor calls "An Interverting, Intertwining Spinning Reel, for doubling and twisting yarn and thread, for wrapping wire, and for spinning silk thread from the cocoon." The machinery described is placed in a frame of small dimensions, and is intended for domestic use. The variety of purposes to which it is to be applied, are scarcely compatible in one small machine, more especially when used by persons of but moderate skill; it may well be doubted, therefore, whether this intention will ever be fulfilled. Some pains have been taken in the description, but yet some of the essential parts which are referred to are not distinctly explained, the drawing being small, but indifferently executed, and not representing any thing in detail. The claims are to the arrangement of the different parts as described, to suit domestic purposes; the manner in which the dead spindle and spool are operated upon, and the use of the tube of flyers, when the flyers are off, as a condenser tube for

drawing wool, and preparing it for spinning; the drilled eyes and tube from the doubling spindle, and the shifting spindle with cups for wrapping wire, or cord; the principle on which the reel counts the threads, &c. &c.

The model is referred to, and depended upon for illustration, as is too frequently done in specifications.

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10. For *Making Pitch:* Henry Ruggles, city of New York, December 2.

The pitch is to be made from the material called "refuse," which is left after the preparation of gas at those works where rosin is employed. This refuse is a dark coloured liquid, which is first to be boiled, to drive off all the volatile, or spirituous, matter which is contained in it; after which it is to be mixed with common rosin, brought to a fluid state in a suitable vat. The hardness of the pitch will depend upon the length of time during which the refuse has been kept boiling. The claim is to "the exclusive privilege of mixing the liquid called 'refuse' with rosin, for the purpose of making pitch."

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11. For *Circular Tenter Bars;* Stephen R. Parkhurst, Providence, Providence county, Rhode Island, December 2.

The whole title is, "Circular tenter bars, for the tentering and drying all kinds of woolen and cotton goods;" and the contrivance appears to be a very good one, performing, in a small space, what, by the ordinary method, occupies considerable room. The apparatus consists of two wheels upon a shaft, which must be of such length as will allow the wheels to stand at such distance apart as shall be equal to the width of the cloth to be tentered; by means of a screw, the distance of these wheels may be easily regulated. Upon the inner surface of each wheel, a spiral of wood or metal runs from the shaft to the periphery of the wheel, the threads of the spiral to be about four and a half inches apart. Holes are bored through these spirals, at the distance of from two to four and a half inches apart, and through these holes there pass iron pins, which slide and turn freely in them, and have heads formed on the outer, and hooks on the inner, side of the wheel. The shaft and wheels are supported on a suitable frame; one end of the cloth is attached by hooks near and parallel to the shaft, and the edges to the spirally placed tenter hooks; after which the cloth is to be properly strained in width, by means of a screw nut, which removes the wheels farther apart. The diameter of the wheels will be governed by the length of the cloth to be received on them.

The claim is to the machine as described, for the "tentering, stretching, and drying, of cloth, by means of the hooked circular bars, and the method of adjusting and working the same. The advantages of the machine are, that it may be used in a small room—it renders the cloths even for rolling up—keeps the nap perfectly smooth, and expedites the drying."

12. For an improvement in *Fire-places and Stoves;* Elias W. Newton, Middletown, Middlesex county, Connecticut, December 3.

This improvement is said to be applicable to "fireplaces and stoves of every description, especially the kitchen, or cooking stove." The kind of stove used by the patentee is particularly described, but this is not claimed as making a part of the invention, although its arrangement is stated to be such as to render it particularly economical.

"The back of the furnace, against which the fire acts most intensely, is cast hollow, so that a space of two inches, more or less, between the plates, is water tight, having at the bottom of one end thereof, an orifice, closed with a movable stopper, for the purpose of cleaning the space when necessary. From the top to the opposite ends of the same space, extends a pipe, of suitable size and convenient length, to a reservoir, or boiler, with which it is connected by a proper joint. This reservoir, or boiler, contains water, and the bottom of it stands on a level with the top of the back of the furnace."

"I claim as my invention or improvement, the back applied or adapted in the manner above described, to ordinary fireplaces of all kinds, and to stoves of every kind, form, and description, so as to perform the various operations of cooking by boiling, of furnishing boiling water for chemical or other purposes, and of diffusing heat, all at the same time, and, when required, in a kitchen, laboratory, or other apartment."

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13. For *Rail-road Tracks and Wheels;* Edward C. Hyde, Natchez, Adams county, Mississippi, December 3.

We have here an old story, with some additions, but no improvements. To enable cars to ascend inclined planes, there is to be fixed to the axles, either at their centres, or at each of their ends, cogged wheels, which are to mash into corresponding cogs on the track. The cogged wheels are to be of smaller diameter than the ordinary wheels, the rails being so placed as to correspond with them. Thus far, the patentee has reinvented, or repatented, what has been several times previously invented and patented. There is something novel, however, in the form, or rather in the forms, of his cogs, but these forms are very indefinitely explained. To engineers, however, there will be no loss from this cause, as their mathematical and practical knowledge have been better teachers than the patentee, who, in the example before us, is equally distant from correctness and clearness. That we may not be supposed to misrepresent, we give his own words.

"These cogs to be made half round, half oval, or of a conical shape, alternating with corresponding half round, half oval, or conical spaces, made to match similar cogs and spaces on the tracks. These cogs on the wheels may be made on plane or bevilled sur-

faces, and of any size required, those of the tracks and wheels always corresponding."

"What I claim as my own invention, is the application of the cogs as a retaining and regulating power, which, by their round shape, obviate the friction of the parallel surfaces of the usual form of cogs," &c.

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14. For a *Side Saddle;* Olney Briggs, Schoharie, Schoharie county, New York, December 3.

The object in view is to convert, when necessary, a common man's riding saddle into a side saddle. The method of making and attaching the horns are particularly described, and claimed, and these methods may be in part new, but the general plan was devised and put into practice many years since, although it was not patented. About eight years ago, such a saddle, complete, was deposited in the Patent Office, but was subsequently withdrawn by the manufacturer.

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15. For the *Application of Caoutchouc to the Ropes used in Dragging Cars on Inclined Planes, &c.;* Patrick Markie, city of New York. First patented October 16th; patent surrendered, and reissued upon an amended specification, December 3.

We noticed this patent under the former date, and proposed publishing the specification; it, however, will be sufficient to observe, that the only object of the surrender was to enumerate, in the new specification, a greater number of applications of the coated, or saturated ropes, there not being any thing peculiar in the means of saturating, or coating them.

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16. For a *Press for Cotton, Hay, &c.;* Isaac Robinson, assignee of William T. Baker; the former of Portland, in the county of Cumberland, Maine, December 17.

This is the well known rack and pinion press. Upon a shaft passing through the cheeks of the press, there is to be a pinion taking into a cog wheel on the middle of a second shaft, parallel to, but in advance of, and below it, and upon this second shaft are two pinions, one near each end, taking into two racks, the lower ends of which are attached to the follower of the press. The first shaft is to be turned by means of a large wheel, having hand pins on its periphery. Such is the whole arrangement of this press, but neither to the parts, or to the whole, of it, is there any claim made.

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17. For a *Machine for Removing Weights, and Loading and Unloading Boats, &c.;* Thomas Patten, Sr., Bowling Green, Warren county, Kentucky, December 17.

The machinery described consists of two rails, or ways, placed parallel to each other, and supported by strong posts, upon which ways a truck, or car, is to run. The weight, or load, to be removed, is to be suspended below the car, and may be held in a scale, or sustained

by hooks, or otherwise. Upon the car there is a machine operating upon the principle of the common hoisting jack, the box of which may be ten feet, or of any other required length. In the drawing, the rails are represented as fixed upon a boat, or scow; but it is stated that they may be extended from a wharf, or warehouse, for loading or unloading craft. The patentee says, "My invention chiefly consists in the construction of a way for transferring heavy weights, in such manner as to allow the weight transported to swing below the way on which the car is to be moved, to which car the weight is to be attached, as already described. The invention may be denominated the elevating and transporting way, or engine."

The description and use of the foregoing apparatus are given in a very clear and distinct manner, and manifestly under a full impression that the whole plan is new.

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18. For a *Mortising Machine;* John Hassett Chandler, Worcester, Worcester county, Massachusetts, December 17.

The patentee says, "All I claim as my invention, is the groove in the piston, with the forked spring and ring with tooth and handle for turning it, with the application also of a chisel with lateral edges." Excepting in certain unimportant points of arrangement, there is but little difference between this and other mortising machines previously patented; even the chisel with lateral edges has been before applied, and is not, therefore, the legitimate subject for a claim.

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19. For machinery for *Roping Cotton, &c.;* Loys Brewster, widow and legal representative of Gilbert Brewster, late of Poughkeepsie, Dutchess county, New York, December 17.

The apparatus intended to be patented is represented very perfectly in a drawing, but there are no references to it whatever, the explicit requirement of the law in this particular having been altogether overlooked. In the specification, we are informed that "the operation of the machine is to put on, or wind, roping on a bobbin without any heads, and to make it in the shape of a cop, or bevilled at each end, so that it will remain firm on the spool in the process of handling and spinning." There is no claim made, and no indication of what constitutes the novelty of the machine, with the exception of what is contained in the foregoing quotation.

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20. For an *Easy Chair;* Benjamin Franklin Hays, Pittsfield, Berkshire county, Massachusetts, December 17.

There are in this chair a number of ingeniously devised contrivances for moving, shifting, and adapting its various parts, so as to contribute to the relief of invalids, and render it useful for other purposes; to these parts there are numerous references, which would be useless without the drawing; all we can do, therefore, is to give the claim, which will make the general intention of the contrivance known.

"What I claim as my invention, and not previously known in the

above described machine, is, 1st. Holding the back and foot pieces at any given angle, by a simple strap and buckle, or rolling cylinder, around which the strap, or cord, may be wound by a crank. 2d. The sliding pannels in the foot pieces, by means of which the chair can be made of ordinary height, and the bed of any required length. 3d. Head piece in the back, so calculated as to lengthen the back when in a chair, and shorten it when in a bed, forming a head piece when in a perpendicular position, and a head board when in a horizontal position. 4th. The side rockers with a joint in the middle, so made as to be operated on by a lever, by which an individual can raise himself by a simple and easy motion, from a rolling to a rocking chair. Cross rockers, confined by the same pivot (though not necessary) which confines the side rockers. 6th. Sliding or moving bar, to which the cross rockers are attached by rods and staples, and by the moving of which bar on the arbor, the cross rockers are folded into a horizontal, or pressed out into a perpendicular, position. 7th. Rollers, or casters, so applied as to form a check to both pair of rockers, and operating on the same pivot."

The foregoing claims are undoubtedly sufficiently distinct and particular, if they are not too much so for the interest of the patentee; from the manner in which they are made, they would seem to confine him to the precise methods represented; and from their number, there is danger that some one or more of them may have previously been used, as there is a host of similar invalid chairs here and in Europe.

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21. For an improvement in the *Construction of Bedsteads;* Benjamin Humphreville, and James King, Morristown, Morris county, New Jersey, December 17.

This improvement is said to consist of two parts, the first of which directs the making the legs of low post bedsteads in such a manner that they may turn upon a bolt, or pin, at their upper ends, so as to fold into a groove, or opening, along the head and foot rails, thus admitting of the bedstead, when not in use, being placed against a wall, so as to occupy but little more room than a wide plank. The second is in the manner of fixing the slats, which are used as a substitute for sacking bottoms. Slats are to be made to extend from one side rail to the other, but not to rest upon them, as they are to be supported entirely by the end rails. These slats are to be connected together by two ropes, in such way as to keep them at the proper distance from each other. Two iron rods, or straps, generally of hoop iron, are stretched between the head and foot rails, for these slats to lie on; in order to stretch them, screw bolts, terminating in hooks, pass through the head and foot rail, and by turning these, the required tension is given to the rods, or straps; the slats are then laid upon them, and kept in their places by fastening the cords to the hooks. The tightening screws serve as pins, upon which the legs turn.

This mode of using slats, it is proposed to apply to sofas, and a

number of other articles. There is no distinct claim made, but the two points mentioned are manifestly the things intended to be patented. Of the first item we do not think very favourably, as legs so constructed will necessarily make harbours for vermin; we are apprehensive, also, that it will be found of little utility, as the stowing away of the bed and bedding, as well as of the bedsteads, will be a very troublesome affair, unattended with much advantage in point of room.

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29. For a *Thrashing Machine;* Charles P. Tenant, and William Eaton, Wooster, Wayne county, Ohio, December 17.

"We claim as our invention, the peculiar form and construction of the machine, together with the manner of regulating the cylinder by means of two screws; and the scolloped floats."

The peculiar form we cannot perceive; the scolloped floats are the beaters of iron, with scolloped edges; and the screws are to set the cylinder at a greater or less distance from the concave.

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23. For *Smelting Iron Ore with Anthracite Coal;* Thomas S. Ridgway, Pottsville, Schuylkill county, Pennsylvania, December 17.

(See specification.)

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24. For a *Machine for Shelling Corn;* Warren Johnson, Boscawen, Merrimack county, New Hampshire, December 17.

The description of this machine is equally brief and obscure, the whole being comprised in the following words. "It consists of an upright square box, about three feet and a half high, and eighteen inches square; a hopper in the top; a feeding cylinder of wood, with springs under the grooves, and two shelling cylinders of wood, or cast iron, full of picks; a spring shoe, with a roller at the bottom, and springs to press the ears of corn against the picks; a grate of cast iron, through which the corn passes, and to cast off the cob; and below, a fan to winnow the corn. The whole moved by five cast iron cog wheels, moved by a crank. The cylinders are all horizontal."

If this is "full, clear, and exact," so would the same number of words be, if thrown together pellmell. The drawing is well executed, but presents us with a machine much more complicated than those in general use, and without any perceptible corresponding advantages.

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25. For a *Cooking Stove;* James Childs, Henniker, Merrimack county, New Hampshire, December 17.

The claims made by the patentee, are to "the passage of the fire by a single horizontal aperture through the back of the fireplace, and its equal division and draught under and over the oven, by the elevation of the cast iron back of the oven as high as the middle of said aperture, and above the top of the oven. The making the spaces remote from the fireplace, both under and above the oven, larger

than the aperture, and thereby improving the draught of the stove. Also, the enlargement of the back part of the stove by the perpendicular wing at the bottom, and the wings at the sides, whereby a larger oven is made than in any other stove of equal size, and other conveniences, and is more uniformly heated by being at a level with the fireplace, allowing the fire also to act more directly upon whatever is placed upon the orifices at the top, than in any other stove."

The drawing accompanying this specification is a very imperfect affair, not representing many of the parts described, and several of the figures are without written references; we cannot, therefore, undertake to express a judgment either of its novelty or utility.

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26. For *Stone Hammers;* Galen H. Pierce, Middleborough, Plymouth county, Massachusetts, December 17.

These stone hammers are to be made of iron, with a deep groove at each end, to receive steel dies. The dies are to be fixed in their places either by screws, or by a taper pin. When screws are used, there are to be three, two of which pass through one of the iron cheeks, and are tapped into the die, the third, or middle one, being tapped into the iron cheek, and bearing with its end against the die. When a pin is used, a hole is to be bored between the pin and the die, from end to end of the groove, one-half in the steel, the other in the iron; this hole is to be tapered, and a pin driven into it fastens the die in its place. The claim is to "the mode above described of fastening the dies or blades into the eye, or head piece, of a hammer for cutting stones."

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27. For a *Lath Machine;* Siba and Caleb Howard, Plymouth county, Massachusetts, December 17.

"We claim as our invention, the application of one or more horizontal [circular] saws, so placed that laths may be sawed from a block of wood at one operation, as described above. We make the large upright saw about thirty inches in diameter, and the horizontal saws about seven inches.

"The frame upon which the block from which the laths are to be sawed is fastened, is moved up toward the saw the width or thickness of a lath each time the carriage returns to its first position, by a rack and setting dogs in the usual way. The teeth of the rack are varied, so that the laths may be sawed edgewise or flatwise, as may be desired. We claim no other parts of the machine than the horizontal circular saws, and the fixtures necessary to their operation, as described above, by which laths may be sawed completely at one operation."

In vol. xi., p. 319, there is the specification of a patent for cutting laths by means of circular saws, operating simultaneously on the edges and sides. In the only point claimed, therefore, the patentees have been anticipated.

28. For an improvement in the *Lay of the Power Loom;* Benjamin Brooks, Newmarket, Rockingham county, New Hampshire, December 17.

The improvement is in that part of the lay which is called the reed binder, and consists in the application of spiral springs in such a way as to equalize the pressure which may be obtained between the reed binder and the reed, and causing the pressure to be applied with facility to any part of the length of the reed; "the springs being so placed as to be out of the way of the other parts of the loom, and not so liable to be affected by changes in the temperature of the weather, as the springs in use for the same purposes." The claim is to "the application of spiral springs to the reed binder in the power loom, in the manner above described, or in any other convenient manner." The description is very clear, and well exemplified in the drawing, without which it would not be easy to convey a correct idea of the particular plan adopted.

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29. For a *Washing Machine;* William C. Kniffin, Alexander, Genesee county, New York, December 17.

This washing machine consists of a box, or trough, in which two pistons, or dashers, are worked up and down by means of a horizontal lever, vibrating on a fulcrum above the centre of the box. The dashers are fluted on their under sides, and there are corresponding flutes on the bottom of the box. There is no claim.

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30. For a *Machine for Planting and Covering Corn;* Thacker V. Bush, Clark county, Kentucky, December 17.

This machine is intended to lay off the ground, drop the grain, cover it, and rake the ground; the patentee, after describing it, claims "the foregoing machinery made in the manner, and for the purposes, hereinbefore described," without designating any particular part as new. Was the general arrangement of the instrument altogether different from all those which have been previously contrived for the same purpose, such a claim might be a good one, but this is very far from being the case; the hopper, wheel, rakes, share, or hoe, and their mode of operation, have little in them that is new, and do not, therefore, require particular notice.

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31. For a *Machine for Dressing Staves;* Asahel Fairchild, Queensbury, Warren county, New York, December 17.

This machine consists of a hollowing and a rounding plane, which are to be made to traverse horizontally, by means of cranks, upon the shaft of a fly wheel. The particular arrangement of the respective parts is not described, and the claim is simply to "the application of hollowing and rounding planes, when moved by power other than the hand, to the shaping and dressing of staves."

Such a machine cannot be applied, excepting to such staves as are perfectly straight, and there are certainly many machines previously

patented which will not only work more rapidly than this, but which are applicable to staves that could not be dressed by it.

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32. For an improvement in *Ovens;* Samuel S. Eaton, Mansfield, Tolland county, Connecticut, December 17.

The ovens here patented are to be placed above the fire, in the back wall of a common fireplace, with a cavity large enough to receive the oven, and to allow of a two inch flue under, back of, and around it. The oven is to be a rectangular box, which may be two feet long, one foot in height, and the same in depth. The front of it is to be closed by a door, hinged at its bottom edge to the lower plate of the oven. There are to be dampers, or valves, to close, either wholly or partially, the opening of the oven flue, below the door. The claim is to "the application of ovens to common and ordinary fireplaces, to obtain heat without any additional expense of fuel, or labour to create a fire."

There must be something more in these ovens, or fireplaces, than is described, or represented in the drawings, or they will not only be very inconvenient, but altogether inefficient. An oven door behind and above the fire, in a common fireplace, appears to be a most awkward contrivance; and by what means the flame and heated air are, at any time, to be induced to pass round the oven, does not appear, as the ordinary flue, above the oven, is represented as entirely open, leaving a free passage to the draught directly into it, at all times. We presume, however, that it is intended to close it by a damper, or register, although nothing is said about it.

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33. For an improvement in the *Manufacturing of Sheet and Boiler Iron;* John M'Nary, Brooklyn, Kings county, New York, December 17.

Iron is to be cast in plates of a proper size, and is then to be annealed, in the manner now practised both here and in Europe; after annealing, it is to be rolled out in the ordinary rolling mill, to the proper thickness. The claim is to "the use of malleable cast iron, in the above described manufacturing of sheet iron and boiler plate."

Without stopping to discuss the validity of the claim, we are compelled to doubt the success of the process. That such iron may be rolled out, we are well aware; but we do not believe that it will possess the tenacity of good boiler iron, made in the ordinary way, and without this it will be of less than no value in its application to steam boilers.

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34. For an improvement in the art of *Manufacturing Scythes;* Augustus H. Searle, Indianapolis, Marion county, Indiana, December 17.

This improvement "consists in sinking the back part of the web by means of steel dies, confined in hammers, operated by water or steam power, in such manner as shall produce a small shoulder, or stay, on each side of the web, and is, in effect, a second back, or stay, on each

side of the scythe. Two sets of dies, models of those I use in the manufacture of scythes, as above described, together with two scythes manufactured by the use of them, I have transmitted."

There is no drawing accompanying this patent, and the patentee, therefore, has not complied with the requirements of the law, as it is one of those cases that "admits of drawings," and, in fact, actually requires them. A section, at least, of the blade should have been furnished. Every reader must perceive that the foregoing description does not, in the absence of a drawing, inform him precisely what the patentee intends.

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35. For a *Thrashing Machine;* Webber Furbish, Hallowell, Kennebeck county, Maine, December 17.

The claim is to "the cast or wrought iron beaters, set upon or into a cylinder, the form of the teeth, the arrangement of the teeth in the concave segment, and the general arrangement of the machine." Were we asked which of these claims could be sustained, we should be at a loss to designate one, as the whole machine is as much like some others as it could well be made. The drawing is very defective, and, indeed, is not worthy the name.

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36. For an *Oven;* Benjamin Blaney, Boston, Massachusetts, December 17.

The oven which forms the subject of this patent is to consist of a rectangular metallic box, with a furnace below, also of metal, and capable of being drawn out, to ignite the fire. The heated air is to pass up, beside, and over, the oven, and is to descend again before it enters the flue. The whole is to be enclosed in brickwork, and particular devices are pointed out to prevent the escape of heat, in which, however, there is nothing new in principle; the particular arrangements spoken of are distinctly represented in appropriate drawings. A thermometer is to be so fixed as to have its bulb within the oven.

"The petitioner claims the general arrangement of the oven; and particularly the passing of the heat in the funnels within the brick walls, as above described; and also the application of a thermometer, which enables the operator to graduate the heat, and acccomplish with certainty the desired results."

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37. For a *Machine for Hulling and Breaking Cotton Seed;* Charles Beck, and William Jenks, Columbia, South Carolina, December 17.

(See specification.)

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38. For a mode and *Machine for making Wrought Nails, Tacks, or Spikes;* William C. Grimes, York, York county, Pennsylvania, December 17.

(See specification.)

39. For a mode of *Manufacturing Wrought Nails, Tacks, or Spikes*, by first preparing the material, rods, or pieces, in such a manner as greatly to facilitate the process. William C. Grimes, York, York county, Pennsylvania, December 17.

(See specification.)

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40. For *Apparatus for Applying, Abstracting, and Conducting, Heat;* John Cooper Douglass, New York, but now residing in London, December 23.

The title of this patent led us to expect much more than we find in it, the exemplifications given being principally confined to two points, with some very vague refrences to others. In the first place, a vessel is exhibited, in which either the vinous or acetous fermentations are to be carried on. This vessel is to be heated by carrying steam tubes through the lower part of it. The vapour which arises from the fermenting liquor is to be carried through a condenser, consisting of a congeries of vertical tubes, surrounded by water. "I thus save the vinous particles; the acetous particles are also thus saved, for the purpose of adding to my vinegar."

The second particular operation of the heat abstracting and conducting apparatus, is to the miner's *safety lamp.* Air is to be admitted through wire gauze at the bottom of the lamp, the light being emitted through a lamina of talc, or other transparent medium. Immediately above the wick is a tube, apparently about an inch in diameter, leading to the top of the lamp, and forming a central chimney; the top of which tube is covered with wire gauze; this chimney is surrounded by a chamber containing water, which, by its evaporation, is to prevent the too great heating of the lamp.

The claims made are to the application of heat to close vessels, so that the vapour arising from the liquid contained therein may be condensed and saved; also, "the use of water, or other liquid, or the use of metals, for abstracting, or conducting away, the heat of a safety lamp."

Besides the foregoing, mention is made of plates of metal, to distribute or conduct heat within boilers, or other apparatus, and figures are given of this application, but these are not accompanied by any definite explanations, nor, so far as we understand them, is there any thing new in the idea of applying them; the object, we presume, being merely the increase of the metallic surface by which heat is to be diffused.

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41. For a *Brick Machine;* Daniel Wolfe, Mount Vernon, Knox county, Ohio, December 23.

This machine is intended for the pressing of brick from clay unmixed with water, but merely pulverized, or broken up. The pressure is made by the revolution of a horizontal shaft on the upper part of the machine, a cam upon which forces down a piston, the lower end of which enters the mould, the piston rod having a friction roller on its upper end, to lessen the friction of the cam. The bottom of

the mould is formed of a second piston, or lifter, which is made to rise when the brick is pressed, and presents it for removal at the top of the mould; this lifter then falls, and the mould advances from under the piston, to be filled with the pulverized clay. At each end of the mould there is a piece cut out of its upper edge, in a semicircular form, and as it returns under the piston, the clay is removed by a semicircular projecting piece, fitting into these excavations; the clay then lies in the form of a hollow trough. The design of this is to leave a sufficient quantity at the sides to render the angles solid.

We have not attempted to describe the accessory parts by which the different movements are communicated, not deeming it important so to do. The claim is to "the arrangement and combination of the machinery as described, so as to carry on the several parts of the process usual in making bricks from clay not mixed with water. Also, the improvement of the mould, by adapting the semicircular openings to the ends of the moulds, instead of to the sides, the brick being thereby made of the same strength throughout."

The improvement last spoken of refers, we apprehend, to a mould previously made, but more recently patented, which has hollows at the sides; we should esteem this a mere colorable variation, and not that kind of substantial difference upon which a claim ought to rest. The piston worked by a cam, in the manner described, can scarcely be made to exert that immense power which is necessary to the consolidation of dry clay.

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42. For a *Machine for Cutting Grass and Grain;* Enoch Ambler, Root, Montgomery county, New York, December 23.

If mere measurement is description, this machine is well described, the specification consisting of the dimensions of the respective parts, without any reference to them by letters or otherwise, and, of course, there is no claim made, as what is not described could not well be claimed. The drawing affords but an imperfect representation of the instrument, and, so far as we are able to judge of it from what is shown, it is similar in principle, but inferior in construction, to several other mowing machines which have been patented.

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43. For *Bellows for Furnaces and Forges;* John R. Morrison, Springfield, Jefferson county, Ohio, December 23.

The bellows here described consists of a square box, having a partition, or diaphragm, placed horizontally near its centre, furnished with a suitable valve opening upwards. The top of the box consists of a plank, attached to its edges by means of leather, and capable of rising and falling; the bottom, or lower board, is attached in a similar manner, is furnished with valves, and is worked up and down by a lever. A tube conducts the wind from the upper compartment to the forge, or furnace. The claim is to "the whole bellows, as above described, with the exception of the pipe and valves."

The foregoing claim can scarcely be sustained in all its breadth, as bellows strongly resembling that described have been, and are,

employed. Whatever is new in the arrangement ought to have been pointed out, as the "whole bellows" certainly includes all its individual parts.

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44. For a *Straw Cutter;* Joshua Moore, Roane county, Tennessee, December 23.

The patentee has made short work with his specification, and we think that he should have either said more, or nothing, as he claims nothing new. The whole description is in the following words.

"The box is in the usual form for cutting straw, or hay. The improvement is in having a short knife facing the front of the box, fastened to an upright iron bar, which is attached to a treadle that works between the front feet of the box, and one end of the treadle is fastened to the left leg of the box, with a spring under it to raise it, and the other end extending through the right leg. The box is faced with iron, having in it a groove, in which the knife plays."

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45. For a *Corn Sheller;* Ezekiel W. Coffin, Gilead, Oxford county, Maine, December 23.

"The said machine consists of a frame, or box, square, or nearly so, with a hopper fitting the upper part, where the ears of corn are placed, and fall horizontally on to a transverse cylinder reeded, to be made of iron, or wood, which carries the ears under it in contact with a reversed cylinder; the cob to be separated from the corn by being raised by the cylinder, and thrown over the opposite side, while the corn falls into boxes below."

We have in this, as in the preceding patent, given the whole description, which has the negative merit of being equally brief, and the positive defect, like it, of not fulfilling the requirements of the law, in affording a "full, clear, and exact" description, and distinctly telling what is claimed as new. Judging from the drawing, we are inclined to believe that there is enough of originality in the machine upon which to have founded a claim, although there may not be any thing in it superior to others for the same purpose.

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46. For a *Cheese Curd Cutter;* Isaac Hunter, Jr., Braintree, Worcester county, Massachusetts, December 23.

A box, or trough, is to be made, which may be about eighteen inches long, seven and a half wide, and five and a half deep. The top of it is to open by means of hinges, for the purpose of filling it with curd; its ends are left open, but across one of them flattened wires are to be passed vertically and horizontally, so as to form rectangular meshes of about half an inch each; these wires present their edges towards the inside of the box, and operate as cutters to divide the curd. A piston, or follower, forces the curd forward, being, for this purpose, attached to a rod, notched on its upper side, which extends out behind it. A knife is worked up and down by hand, at the cutting end of the box; the frame to which the knife is fastened, is attached to two levers, one of which extends back on each side of

the box, nearly to its back end, where they are attached to a shaft which crosses from side to side near its upper edge; on the middle of this shaft there is a short arm, extending downwards, and carrying a pall, which takes into the notches on the rod of the follower, the effect of which is to advance it about half an inch, by the rising and falling of the knife, which, by its descent, divides the curd into cubes of about half an inch each.

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47. For a *Machine for Dressing Manilla Hemp, &c.;* Chandler E. Potter, Portsmouth, Rockingham county, New Hampshire, December 23.

The hemp is to be dressed by means of revolving combs, fixed into bars which extend between two circular heads, about twenty inches in diameter, and six feet apart; of these bars, there may be four, which are to be set with hooked teeth about three inches long. These bars are to revolve like the beaters of a thrashing machine. At the back part of the frame there is a fixed comb, between the teeth of which those on the beaters pass, and are thus cleaned of any adhering fibres. The hemp is to be hung over an inclined plank, which, towards its lower edge, is made concave, to conform to the cylindrical motion of the dressing bars. The hand of hemp is to be held by twisting one end of it round an iron pin, fixed for the purpose, letting it out as the dressing proceeds, and reversing it to dress both ends. The claim made is to "the combination and arrangement of the machine, and the adaptation of the cylinder, with its teeth, to the cleaning and dressing manilla hemp, and other substances of a like nature."

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48. For an improvement in the *Stomach Pump, Cupping Instrument, and Breast Pump;* Lemuel B. White, city of New York. First patented July 22d, 1833; surrendered, and reissued upon an amended specification, December 23d, 1834.

We noticed this patent at p. 36, vol. xiii., and observed upon the total inadequacy of the specification, a defect which that before us is intended to remove. It appears, however, that this is not a single instrument, but that the same syringe is to be applied to instruments for three or four different purposes. It is, for example, to be applied to a cup of metal, or glass, for the operation of cupping; to another, when the breast is to be drawn; and to a stomach pump, when that instrument is required. In this last apparatus, two ball valves are to be employed, to operate in the receiving and discharging parts of the instrument. The same apparatus, it is observed, may be used for injections. The claims are of some length, but, we think, embrace the old and the new together; much dependence, however, appears to be placed on the arrangement of the whole, "so as to combine in one instrument a complete cupping apparatus; an instrument for evacuating the female breast; a stomach pump, and injecting apparatus, whereby it is rendered much cheaper, more portable, &c." "and one common syringe is made to serve all the purposes above described."

The whole is contained in one box, but certainly the cup and the stomach pump are not one instrument, although the same syringe may be attached to either.

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49. For a *Machine for Splitting Palm Leaves*; Charles Wadsworth, Barre, Worcester county, Massachusetts, December 23.

"The common way of splitting palm leaves for hats," it is observed, "has been by pressing the leaf upon sharp points, or blades, and drawing the leaf against them, and thus splitting them." "In my machine, the leaf is presented to the knives by means of two rollers, or cylinders. The rollers may be made of wood, iron, or any other suitable material; there are deep grooves cut in each roller; all the grooves are precisely alike, and at a distance from each other equal to the width of the palm leaf after it is split into strips for braiding. The grooves in the upper roller are directly above those in the lower roller. There are as many knives as there are grooves in one of the rollers; each knife is made crotched, and the grooves in the upper and lower rollers receive the upper and lower forks of these crotched knives. Each knife is sharp directly at the crotch, and it is to this point in the knives that the leaf is presented by the rollers. The knives are attached to a bar, which is connected to the frame holding the rollers."

"What I claim as my invention, is the employing rollers in connection with knives for splitting palm leaves, in the manner above specified and described."

A patent was obtained for a machine for splitting palm leaf, on the 17th of last month, and is noticed at p. 398 of the last volume. The cutting, although performed by means of cylinders, is on a different principle from that above described.

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50. For a *Machine for Planing and Matching Boards;* Zadock B. Grover, and David Lampton, Springwater, Livingston county, New York, December 23.

This planing and tonguing and grooving apparatus is not as clearly described as might be desired, although the specification is of sufficient length, and the drawings are well executed; it appears plainly, however, that it is similar in principle to Woodworth's machine, although differing from it in its minor arrangements. What the patentees have invented, they do not tell us, there not being any thing in the nature of a claim.

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51. For a *Planing Machine;* Thomas E. Daniels, Worcester, Worcester county, Massachusetts, December 23.

A vertical shaft is to revolve in a suitable frame, with collars to keep it in its proper position. The frame in which the shaft revolves, slides in vertical cheeks, to admit of its being raised or lowered. Two arms project out at right angles from the shaft, and these have slots in them to receive the cutters by which the board is to be planed.

This is to be secured upon a horizontal carriage, moved forward by a pinion acting upon a rack on its lower side. The general operation of the machine has nothing in it of novelty, and "the moving the cutters to the wood to be planed," constitutes the whole of the claim; that is, the raising or lowering of the slide in which the cutters work, instead of raising and lowering the bed, to adapt the machine to stuff of different thickness.

We could refer to several machines in which the cutters are moved to adapt them to the thickness of the wood; of these, one is mentioned in vol. ix., p. 313, in which "the shaft has a sliding motion in the collars, to adapt it to stuff of different thicknesses," and there is a claim to "The sliding motion of the wheel, by which various thicknesses may be planed."

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52. For a *Safety Lock;* Zibeon Wilbur, Woodbury, Litchfield county, Connecticut, December 23.

This lock is described in a very obscure manner, but it is well represented in the drawing. For security, it depends upon the well known principle of combination numbers, or letters; it does not in this, or in its other arrangements, present any thing worthy of particular notice. The patentee informs us in what he considers the principle of his invention to consist, but not in that clear and distinct manner which is to be desired in such cases.

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53. For a *Lathe for Turning Lasts, Boot-trees, &c.;* Henry Mellish, Walpole, Cheshire county, New Hampshire, December 23.

The general principle upon which this lathe operates, is well known to those acquainted with the various kinds of these instruments which have been invented. Lathes for turning ornaments in almost every conceivable form, were in use upwards of a century ago, but were applied more to articles of curiosity than to those of utility. About fifteen years ago, Mr. Thomas Blanchard obtained a patent for turning irregular forms, and applied it principally to the making of lasts; several factories are now in operation, in which this business is carried on. Mr. Blanchard's patent was renewed by Congress the session before the last. We have not taken the trouble to compare the present machine, critically, with that of Mr. Blanchard; their difference from each other, however, is not one of principle, but of particular arrangement only.

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54. For *Propelling Steamboats, and other Vessels;* Isaac Theal, city of New York, December 23.

At p. 15 of the present number we noticed, as we have more than once had occasion to do, a patent for propelling by means of a revolving screw, and we have now before us a thing of precisely the same character. A screw is to be placed longitudinally on each side of the boat; and one of fifty feet in length, we are told, may be about ten feet in diameter, and so in proportion. The patentee calculates

upon having removed the difficulty attending the attainment of very high velocities, and other preinventors of the screw have made similar calculations, but have found that they had missed a figure. Could a river of uniform depth be found, with a bottom of soft mud, into which the threads of the screw might dip, we are inclined to believe that its action would be much aided thereby; but as this is not attainable, we are more than apprehensive that the old-fashioned paddle wheel will maintain a preference over the screw propeller. There is no claim made.

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55. For machinery for *Bending Wheel Tire, and Setting Carriage Springs;* Fowler M. Ray, Cattskill, Greene county, New York, December 24.

We cannot describe this machinery, without the drawing, excepting in a very general way. The patentee, although he has referred to the drawing, has not, in fact, rendered the construction and operation of his machine very clear. The bending and setting are to be effected by means of rollers, and, to regulate the curvature, a piece which bears against the under side of the metal to be bent, may be forced up against it, in any required degree, by means of a rack and lever. The patentee claims "the sole invention and discovery of the machine."

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56. For a *Washing Machine:* Nahum Swett, Readfield, Kennebec county, Maine, December 24.

This machine is, exteriorly, in the form of an inverted key-stone, the bottom being circular. Two boards, fluted across, like common wash-boards, vibrate backward and forward in the box, or trough. They are each fixed by one end to separate shafts, placed at the upper edge of the trough, their lower ends nearly touching its bottom. The shafts have pinions upon them, gearing together, the consequence of which is, that when one of the shafts is worked backward and forward by means of a lever, the boards vibrate in directions opposite to each other.

The claim is to "the general construction of the machine, in which the arms, or washers, are made to move in opposite directions, and to operate on the principle of common fulling mill stocks, by means of two shafts and lever purchase."

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57. For *Steel Carriage Springs;* Lyman Gleason, Stafford, Genessee county, December 24.

A steel bar is to be bent spirally, like the spring of a house bell. The outer end of this spring is to form a strap, by which it is to be attached to the carriage, and its inner end to a pin, by which it is to be connected to the body. There is no claim made, nor are there any letters of reference to the drawing.

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58. For a *Machine for Moulding Bricks;* Robert Ranken, Frankfort, Waldo county, Maine, December 23.

In this machine, the clay is to be mixed in a pug mill, the vertical shaft which carries the knives being turned by a sweep, in the ordinary manner; from this shaft, also, is communicated the various motions necessary to the completion of the process. The clay is to be pushed out from the bottom of the mixing well, into a receiving box directly over the moulds, in which the bricks are to be pressed. A blow is to be struck on the clay, by the dropping of a heavy follower, previous to the final pressing. The claim made is to "the eccentric motion of the cam wheel for vibrating the front frame. The double follower by which a blow is first struck upon the mortar, and heavy pressure afterwards made. The sliding cutter with its appendages, operating in the manner described, and the general arrangement and combination of the respective parts, by which the machine differs in its character from all others previously used for the same purpose."

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59. For a *Clapboard Machine;* Otis and Daniel Parker, Hubbardston, Worcester county, Massachusetts, December 24.

The clapboards are to be cut by means of a circular saw, from timber prepared by quartering at an ordinary saw mill. The machine appears to be well arranged for the purpose in view; the only thing claimed is the manner of presenting the stuff, or timber, to the saw, by means of head blocks of the particular form described. In its general construction, it resembles some other machines for the same purpose.

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60. For a *Horse Power;* William Emmons, city of New York, December 24.

Were all the thrashing, washing, and churning machines, and all the horse powers, which are patented, really new inventions, we should certainly find in them a most apt exemplification of the versatility of human genius; as it is, however, we must seek elsewhere for our illustrations of this topic. Each of them may be divided into two or three classes, under which, with but few exceptions, all the individuals may be arranged. The horse power before us is one of a very numerous class, and is no more than a variety of a well known species.

A vertical shaft is to be turned by a horse attached to a lever, or sweep; upon this vertical shaft there is to be a cog wheel, mashing into a pinion on a second vertical shaft, on the lower end of which there is a bevil wheel taking into a pinion on a horizontal shaft, passing under the feet of the horse, and from which motion is to be communicated, in the usual way, to a thrashing, or other machine.

The patentee gives the precise proportions of the respective parts, and says that what he claims as his "invention and improvement, is the proportions and peculiar arrangement of the several parts of the above described horse power." Now, as regards arrangement, there is nothing peculiar, and as respects proportion, the law declares, "that simply changing the form, or proportions, of any machine, in any degree, shall not be deemed a discovery."

Specifications of American Patents.

Abstract of the Specification of a Patent for a Machine for Moulding Bricks. Granted to William C. Grimes, *of York, in the county of York, in the State of Pennsylvania, December 2nd,* 1834.

This machine is constructed upon the following general principles. A wheel is affixed horizontally to, and revolves with, an upright shaft, the latter being properly supported above and below by a suitable step and box, in which its gudgeons turn. The moulds in which the bricks are to be formed, are placed around and upon the face, or upper side, of the wheel, near its periphery; these may stand in the direction of radii from the centre of the wheel, or otherwise. Two or more moulds may be united or connected together. A hopper, or trough, of sufficient capacity, is placed in an inclined position, with its lower end over one or more of the moulds at a time, as they pass under it. This hopper is to contain the tempered clay of which the bricks are to be made, and through that part of the bottom of it which projects over the mould, or moulds, an opening, or openings, are made of the length and width of a brick, through which the clay is to descend into the moulds. The motion of the wheels is not to be continuous, but intermitting; while it is at rest, a mould is immediately beneath the opening in the bottom of the hopper, or trough, and the clay is then forced by a piston down into it; the piston then rises, and the wheel moves, and the moulds are thus filled in succession. As the filled moulds pass round upon the wheel, they are removed, and replaced by empty ones.

It is manifest that two or more moulds may be filled at the same time, by the use of two or more openings and pistons, and the employment of such other devices as may thereby be rendered necessary, sufficient power being applied for that purpose.

The number of moulds will depend upon the diameter of the wheel, which will admit of considerable variation, but from four to six feet I think the most convenient.

The moulds must be slightly attached to the face of the wheel, which may be done in various ways, the following being among the best. From the under side of the moulds project two dowel pins, which fit into corresponding holes in the face of the wheel, by which means the moulds are kept from any lateral or horizontal movement. The dowel pins should be short, so that the moulds may be readily disengaged from the wheel. The holes for the pins, or dowels, in the face of the wheel, should be pierced through it, so as to prevent them from being filled, or choked with dirt, &c.

Two or more moulds may be united in one frame, as is usual in brick moulds. The frames of the moulds are inclined from each other, like key-stones, so as to stand as radii from the centre of the wheel, thus forming the proper arch or curvature around the wheel, and their upper surfaces should form a true plane. Each frame of moulds has a thin plate, or board, which is equal in length and breadth to its corresponding frame, and forms the bottom or bed of

the moulds. The aforesaid dowel pins pass loosely through holes made for the purpose in this plate; the latter not being otherwise fastened to the moulds, its use will be apparent to any one acquainted with the usual mode of moulding bricks.

The machine may receive its motion by a strap, carried around the fly-wheel, and over a drum, or pulley, which last may be driven by any competent power; or the machine may receive its motion by a crank attached to the fly-wheel shaft, or in any other convenient mode.

I do not mean to confine myself to the particular form or arrangement of the parts as before specified, but to vary them as experience or convenience may dictate, whilst the general principle remains unchanged.

What I claim as new, and as my invention, and for which I ask letters patent, is, 1st. The moulding of brick upon, or in moulds upon, the face of a revolving horizontal wheel, disk, or rim, constructed and acting upon the principle herein specified.

2d. The manner of forcing the clay into the moulds, by the combined action of a feeder and piston.

3d. The general construction and combination of the respective parts of the above described machine, from which general combination it derives that character by which it will be readily distinguished, by any competent machinist, from the various machines for moulding bricks already in use.

And I do hereby declare that I do not intend to claim as my invention, the piston, cranks, hopper, or any other part of the said machine, taken separately and individually, as these may constitute the elements of other machines; but, as aforesaid, the construction and combination of these parts upon the principle by me devised, and herein fully exemplified.

WILLIAM C. GRIMES.

The foregoing comprises about one-half of the specification, the remainder generally referring to the drawings. The same remark will apply to the next patent, and also to those for making nails. The machines manifest much ingenuity, and an account of their performance, when completed, has been promised, which, if satisfactory, will appear in the Journal.—[*Editor.*

Abstract of the Specification of a Patent for a Machine for Pressing Bricks. Granted to WILLIAM C. GRIMES, *of York, York county, Pennsylvania, December 2nd*, 1834.

The general principle of the construction and operation of this machine, is briefly as follows.

Upon a vertical shaft, or spindle, is fixed a wheel, disk, or rim, of sufficient size, which is to revolve horizontally. In the upper face of this wheel are a number of holes, or mortises, which are the moulds in which the bricks are to be pressed. The bottoms of these

moulds are not a fixed portion of the moulding wheel, but are the upper faces of movable pistons, that slide up and down in the moulds, as the wheel revolves. The rods, or posts, which support and guide the pistons, descending vertically from them. The lower ends of the piston rods, or posts, slide round as the wheel revolves, upon a circular horizontal platform, or rim, or rather upon two platforms, one-half of the circle, or thereabouts, being elevated above the other about two or three inches. When the pistons rest upon this elevated portion of the circular rim, or platform, their upper faces are flush with, or above, the upper surface of the wheel; hence the bricks which have been pressed, being thus raised, can be removed with facility; while upon the opposite side of the wheel, the pistons upon the lower portion of the rim, have their upper surfaces sunk down within the moulds, leaving cavities into which the bricks are dropped, as the pistons are depressed, the motion of the wheel, which is intermitting, not being too rapid for that purpose.

Just before the pistons rise on to the elevated portion of the circular rim, they pass under the short end of a strong iron lever, which projects over the face of the horizontal moulding wheel, far enough to cover the moulds as they pass under it. The lever receives a continuous motion from a crank and shackle bar, the latter being jointed to the opposite, or long end, of the lever. The crank is regulated and assisted by a heavy fly-wheel, in passing that point in which there is the greatest resistance to its motion.

While a brick is being pressed by the short end of the lever, the moulding wheel is at rest, as it receives its motion by a pall, or movable hand, that has a vibratory or reciprocating motion, which it receives from a crank fixed for that purpose, on to the end of the fly-wheel shaft.

The horizontal moulding wheel may be of iron, and cast in one entire piece, of such thickness as may be necessary to its strength, the requisite depth of the moulds being formed by a flanch, rim, or projection, standing out upon the face of the wheel, the said rim, or flanch, making the sides and ends of the moulds. The moulds being in a circle, are placed as near to the periphery of the wheel as a proper thickness of metal will allow; the inner ends of the moulds may approach very near to each other, leaving only sufficient strength of metal between them; hence it may be seen that the number of moulds in the face of the wheel will depend entirely upon its diameter, which may be very much varied, but from three to six feet I think the most suitable.

The moulding wheel, pistons, horizontal rim, and fly wheel, should consist of cast iron, and, in fact, the whole machine should be made of metal.

Motion may be given to the machine by a strap, carried round the fly-wheel, or by the crank attached to the end of the fly-wheel shaft, which may project beyond its bearing for that purpose.

I do not mean to confine myself to the particular form and arrangement of the parts as before specified, but to vary them as experience or convenience may dictate, whilst the general principle remains unchanged.

What I claim as new, and as my invention, in the above described machine for pressing brick, and for which I ask letters patent, is—

1st. The revolving horizontal wheel of moulds, constructed in the manner, or upon the principle, herein described, in which the processes of putting in, pressing, and removing the bricks from the moulds, are all done at one and the same time.

2d. I also claim the revolving pistons, as connected with the revolving moulds, and operating in the manner, or upon the principle, set forth in the foregoing specification.

3d. I also claim the employment of the stationary rim with a double platform, for raising and depressing the pistons, as before described.

4th. I also claim the scolloped rim, or flanch, for the purposes hereinbefore set forth.

5th. I also claim the pressing of brick by means of a lever, operating, and operated upon, as herein shown.

6th. I also claim the general construction and combination of the respective parts of the above described machine, from which general combination it derives that character by which any competent machinist will readily distinguish it from any of the brick pressing machines previously in use. But I do not claim the pistons, fly-wheel, shafts, or any other part, taken individually, as these may constitute the elements of other machines; but, as aforesaid, the construction and combination of these parts upon the principle by me devised, and herein fully exemplified.

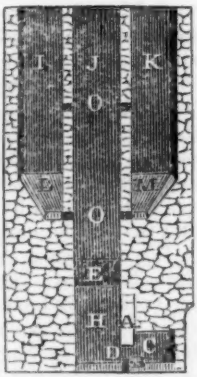
WILLIAM C. GRIMES.

Abstract of a Specification of a Patent for a Furnace for Preparing and Smelting Iron Ore, with Anthracite Coal. Granted to THOMAS S. RIDGWAY, *Pottsville, Schuylkill county, Pennsylvania, December 17th,* 1834.

The hearth of the smelting furnace, or stack, as seen in the section, letter J, may be in the usual form of smelting furnaces, and receive the blast at one or more openings in the bellows wall, made for the purpose, excepting the wind wall, opposite the blast, marked letter H, which is at an angle of forty-five degrees, or thereabout, and extending up the said wall of the stack to the bottom of a door, or opening, letter E, made for the purpose of rendering the fire manageable; this door will be placed in the stack at the top of the smelting fire, which will be from four to six feet high above the hearth, that being about the maximum height that a blast can be forced through anthracite coal; whereas the usual height to which it is forced in a charcoal furnace is thirty-five feet.

Another stack, marked I, in the section, to be charged or loaded with anthracite coal, and kept hot by caloric received from the smelting stack by means of one or more openings in the wall of the smelting stack, opposite O, marked in the draft, at a convenient height

above the smelting fire, or by means of a separate fire, as the case may be; the intention of this operation is to dissipate sulphur from the coal, and to keep it in a proper state of heat for the smelting fire, without useless consumption of fuel. At the bottom of this stack is a door for the purpose of taking out the coal, after it is prepared to put on the smelting fire.



The purifying and carbonating stack, oven, or chest, marked K in the draft, may be attached to the smelting furnace, or be apart from it, and receive caloric, or heat, from the smelting furnace, by one or more apertures in the wall of the smelting stack, opposite the letter O in the draft, or by a separate fire. This stack is to be loaded or charged with iron ore and anthracite coal, or charcoal, or iron ore and charcoal, together with the proper fluxing materials, as may best prepare the ore before it is put on the smelting fire. There is a door in the bottom of this stack, for the purpose of taking out the ore after purification. This indispensable operation of carbonating the ore, cannot be performed without heat, in the absence of oxygen, nor can it be performed in the usual way, owing to the great specific gravity and slow combustion of anthracite coal; whereas, in this way, only a very small quantity of charcoal will be required to purify and carbonate a ton of ore.

What I claim as my own invention is the carbonating stack, oven, or chest, and also the stack for preparing the anthracite coal, and relieving the smelting fire of the great burthen of ore and anthracite coal requisite in the usual way of smelting; also, the inclined wind wall, which renders the smelting fire so manageable that it may be stirred as often as required; and, lastly, the combination of the above three stacks. These may be built of stone, or any good, durable material, and of any convenient size or capacity, suitable to the power of the blast, with valves at the tunnel heads, or top, to regulate and direct the heat from one stack to another.

THOMAS S. RIDGWAY.

Specification of a Patent for a Machine for Hulling and Breaking Cotton Seed, preparatory to the expressing of oil. Granted to CHARLES BECK, *and* WILLIAM JENKS, *Columbia, South Carolina, December 17th,* 1834.

We make a cylinder of wood, either solid or in sections, which is to be perfectly round, and to run on gudgeons in suitable boxes; this cylinder we cover with sheet iron, or sheet steel, punched from the inside, so as to form the surface into a rubber, or grater. The punch by which the teeth are formed is so shaped, that, in raising them, they are straight, or square, on one side, and rounding on the other,

the straight side being that which meets the seed in the turning of the cylinder. These teeth are in spiral rows, placed at an angle of twenty-five or thirty degrees with the cylinder, and about three-fourths of an inch apart.

We also prepare a concave bed of a curvature adapted to the cylinder, which we cover with teeth in the same way, but placing the rows of teeth at a different angle. This concave may be borne up to its place by springs, so that it may recede, should any hard substance pass in with the seed. Its ordinary station, however, is such that its teeth come nearly, but not quite, into contact with those on the cylinder. The hull will be removed from the seed by passing it through this machine, and the seed will also be broken into small pieces, when the two may be separated by a sifter, which may either be attached to the machine, or used subsequently. A machine thus constructed will hull the seed as rapidly as three gins will deliver it, and that in the most effectual manner.

We are aware that machines very similar to that which we have described, have been used for hulling clover and other seeds, and for rubbing and smutting wheat, and other grain; but we have adapted it more perfectly to the hulling and breaking cotton seed, by the form which we have given to the teeth, which adaptation will be clearly understood by an examination of the drawing deposited in the Patent Office; and it is this adaptation which we particularly claim as our invention.

CHARLES BECK,
WILLIAM JENKS.

Abstract of the Specification of a Patent for a mode or machine for making Wrought Nails, Tacks, or Spikes. Granted to WILLIAM C. GRIMES, *York, York county, Pennsylvania, December 17th,* 1834.

To make wrought nails by machinery, is an object that has been sought by numerous individuals; hence it may be useful, in order to point out more clearly the novelty in the present plan, to refer to the general principles upon which preceding machines, or processes, for that purpose have been founded.

One of the first, and, it is believed, an almost universal principle, that has been observed in previous attempts to make wrought nails, has been to make them from rods that were rolled or slit to the size of the larger part of the body of the nail. To taper, or to give to the nail its requisite form, from such rods, various modes have been essayed; swaging, forging, and rolling, have been tried, but the latter by far the most generally. Modifications of these principles, to effect the object proposed, have been too numerous to be here detailed. But, whatever has been the modification of the machine, it has generally embraced, or been constructed to operate upon, only one of these principles. The novelty of the present machine consists in its being constructed so as to combine several of these principles at the

same time, viz: cutting, swaging, or pressing, and forging, or percussion, and to make the novelty more apparent, the nails, &c. are not to be made from rods of the size of the body of the nail, but from broad plates, and these at a red heat. These plates are to be prepared by rolling, after the manner of plates for cut nails, but with this difference,—they must be of perfectly sound iron, and two or three times as broad as the length of the intended nail, but of about the same thickness. These plates are to be cut off transversely into pieces, about two-thirds the length of two nails. From the sides of these pieces, or plates, the nails are to be formed and cut, the length of the nail running with the grain of the iron, or parallel with the length of the original plate. These plates are held, turned over, and the nails cut from the sides or ends of them, in the same manner as is practised in making cut nails, but with this difference,—in making cut nails, the plate is either cold, or at what is called a black heat, whilst in my process the plates are to be at a high red heat. In making cut nails, they are cut off with a regular taper from end to end; in this process, they are tapered not more than half their length. In making cut nails, the width of the plate is the length of the nail; in this process, the plate is cut into lengths transversely, which length forms two nails, by their points overlapping each other. In making cut nails, the first action upon the nail is to sever it from the plate; in this process, the nail is nearly formed before it is severed from the plate.

As the plates are cut at a high red heat, they would soon destroy the temper of the steel cutters, or dies, if continually applied, as in making cut nails; therefore, to prevent such injury, I cut a few nails in rapid succession, and then allow a short intermission, when the plate is withdrawn, and a jet of water is applied for an instant to the dies, which continue in motion, the plate and the jet of water being applied alternately to the dies.

Two or more of these plates should be in the fire at a time, as only a part of one plate can be cut or formed into nails without reheating. The plates may be changed in the furnace during the time that the jet of water is let on to the dies.

The water in the pipe that conducts it to the dies, should be under considerable head, or pressure, and the starting and stopping the jet may be done in various ways; the valves, or cocks, may be opened at regular intervals by the machinery, or a treadle may be applied for that purpose.

When the nail is to be formed and cut from the plate, such a portion of the latter as shall be necessary, is placed between the jaws, or dies, constructed for the purpose, and which are parallel with the end, or edge, of the plate, for about half or two-thirds of the length of the nail. The remainder of the dies are turned off at a slight angle, running out to the edge of the plate, thus forming the taper, or point, of the nail; the plate is then turned over, and its opposite side brought into the same position between the jaws, and another nail is cut, the point of which commences at the same point in the plate that the taper began in the preceding nail.

A heavy hammer, for striking a head upon the nail, is placed in front of the end of the jaws; this hammer is fixed upon the end of an upright rod, or helve, the lower end of which is fixed to a horizontal shaft, furnished with round tenons, or gudgeons, that work in suitable boxes on each side of the frame of the machine. From the side of this shaft an arm projects, being inclined downwards; this arm may be about one-third of the length of the said helve. A beam, or lever, whose fulcrum is near its centre, lies nearly in a horizontal position, with one end beneath the fly-wheel, and the other above the said short arm, to which it is jointed by a link. A cam on the periphery of the fly-wheel acts upon the end of this lever, or beam, the latter being gradually borne down by it, while the opposite end of the beam rises, and, by its aforesaid connection with the hammer, the latter is thrown back to a proper distance; the said cam then terminates abruptly, and, by a strong spring, the hammer is brought forcibly upon the iron which is to form the head of the nail.

I intend sometimes to form the head upon the nail by pressure, instead of percussion.

Any competent power may be employed to impel the machine.

Machines greatly differing in form, and in the particular arrangement of the respective parts, may be constructed upon the preceding principle, to produce similar results, or effect the same end by similar means. I, therefore, do not intend to limit myself to the particular arrangement herein specified, but to change such form and arrangement as I may think proper, while the principle remains unchanged.

What I claim as new, and as my invention, and for which I ask letters patent, is, 1st. The making or forming wrought nails, tacks, or spikes, from, or upon, the edges, or sides, of metallic plates, by pressure and cutting, after the manner, or upon the principle, herein specified.

2d. The manner of severing the plate from the nail, so that a part of the latter is left standing out beyond the end of the jaws, as herein before described.

3d. The side jaw by which the plate is gauged, and the nail compressed, and removed from the jaws.

4th. I also claim the general construction and combination of the respective parts of the above described machine, by which general combination it derives that character by which any competent machinist will readily distinguish it from any of the various nail machines heretofore in use.

But I do not claim as my invention, the fly-wheel, cams, levers, or any other part of the machine, taken separately and individually; but, as aforesaid, the combination of these parts upon the principle herein fully set forth. Nor do I claim the forming of nails from nail plates, by cutting them with the grain, that having been already done; but in this particular I confine myself to the peculiar manner in which the cutting is effected.*

WILLIAM C. GRIMES.

* See note p. 38.—*Editor.*

Abstract of the Specification of a Patent for a mode of manufacturing Wrought Nails, Tacks, or Spikes, by first preparing the material, rod, or pieces, from which they are to be made, in such a manner as greatly to facilitate the process of making them, and then operating upon the pieces so prepared by means of a machine particularly adapted to that purpose. Granted to WILLIAM C. GRIMES, *York, York county, Pennsylvania, December 17th,* 1834.

The metal is first to be rolled or slit into rods, but not of the exact size and form of the body of the nail to be made, but they are to be broader one way, and thinner the other, the rods being usually about twice as broad as they are thick; the width and thickness of the rod, or piece, however, being such that, when it is staved, swaged, or compressed upon its sides, or edges, enough to bring it into a square form, it shall then be of the requisite thickness for the body of the nail, tack, or spike. The rod is to be cut off into the proper lengths for the nails, tacks, or spikes; they are to be cut square off at one end, the other being cut very obliquely across the rod, thus giving the requisite taper for forming the point to the nail, &c., which taper will be greater, or less, according to the obliquity of the cut across the rod. The nails, tacks, or spikes, so prepared, may be finished by various methods, as by forging, swaging, or compression; and the machinery to operate upon either of these principles, to effect the same end, is susceptible of an almost endless variety of modifications.

The machines that I have adopted for the purpose, are made to operate upon the principles of swaging and compression, and are constructed as follows. The prepared piece is let or dropped into the upper end of an angular trough, or gutter, which stands inclined from a vertical line about thirty degrees, (more or less.) The trough consists of two flat sides, joined at right angles, the angular point being downwards, so that, if the trough was placed in a horizontal position, its sides would rise at an angle of forty-five degrees from the horizon; the piece that forms this trough, or gutter, is the ridge, or rather one corner, of a triangular frame. Swages, or hammers, strike or act upon different sides of the nail, as it descends along this trough, or gutter; these swages are placed in pairs, each pair striking upon the nail within the trough alternately, and consequently upon its different sides; their helves, at their outward ends, are jointed to the two lower angles of the frame, and in such position that they operate at right angles with each other.

The piece for the nail, &c., when dropped into the gutter, slides down to a movable piece, or stop, that rises through the bottom of the trough, which arrests it for a moment, or until both swages have operated, when this stop recedes, and the piece instantly slides down until it is arrested by a similar stop, and is again struck by two other swages, and so on through any required number; three pair will, I apprehend, be sufficient in all cases. The last pair of swages, which

are at the lower end of the trough, or gutter, fall upon, and gripe the nail, while a heavy hammer, from below, strikes upon and heads the same. The heading hammer, swages, and stops, all receive their motion from cams fixed upon a revolving shaft, running up through the triangular frame. Two or more nails may be passing down the angular trough at the same time, as the stops, after allowing a nail to pass, immediately resume their position. The swages, hammer, &c., after being raised by the cams, are forced back upon the nail by suitable springs.

I intend sometimes to form or finish the nails by pressure, which is effected in the following, or in a similar, manner. The machine, when intended to finish the nail by pressure, is to be made, generally, like the preceding machine, but the triangular frame will be much shorter, as there will be the lower pair of swages only, the inclined trough, or gutter, having a single stop. The action upon the nail, &c. is to be very similar to that before described, being alternate, and upon different sides, but it is to remain in the same place till finished. After a few reciprocating or alternating motions of the jaws, one or both of them close or press upon the nail, and hold it whilst there is a head pressed upon it. In forming some nails, the alternating motion of the jaws may be unnecessary, as they may close upon the nail at once, and form it sufficiently by this single pressure.

There should be two pairs of shears for cutting off the rod, whether it is cut hot or cold; the cutting edges of these stand at right angles, or nearly so, but both pairs may be fixed upon short arms, standing out from a strong vibrating, or semi-revolving, shaft; one pair to cut the rod off obliquely, and the other pair to cut it square. The two troughs, spouts, or gutters, into which the nails fall from the respective shears, may both lead to the same point, and terminate in one groove, or gutter, before it reaches the machine below.

I intend sometimes to cut the pieces for the nail from plates, instead of from rods. The plate should be of sound material, and rolled much broader than other nail plates. These plates are to be cut off transversely into pieces about two-thirds the length of two nails; from the sides or edges of these plates, the pieces for the nails are to be cut. The plate is to be held and turned over at each cut, in the manner followed in making cut nails, the length of the nail, however, being only about two-thirds of the width of the plate; the shears being bent into such form as to run off to the edge of the plate; the piece thus cut off is brought to an acute point, being tapered less than half its length; the taper, or points, of the nails overlapping each other in the plate. This plate should be at a red heat when the nails are cut from it, if they are to pass directly into the machine; or they may be cut off cold, and afterwards heated and fed to the machine, as before specified.

What I claim as new, and as my invention, in the before described mode of preparing the pieces, or material, for wrought nails, and in the machine for finishing them, and for which I ask letters patent, is,

1st. The cutting the rod obliquely, in the way described, to form in part, or wholly, the taper of the nail, tack, or spike, whereby mere pressure, or swaging, will suffice to finish the nail, &c.; the rods being broader one way, and thinner the other, than the body of the intended nail.

2d. I claim the manner of preparing the pieces for wrought nails, tacks, &c., to be finished in my machine, by cutting them out of plates of metal, as herein before shown. I do not claim the cutting with the grain of the metal generally, that having been previously done, but confine myself to the cutting into the form, and for the purpose, described. I claim the forming or finishing nails, tacks, or spikes, or other metallic articles, by swaging in, or as they descend an inclined trough, or gutter, after the manner, or upon the principle, herein before specified.

3d. I claim the finishing of nails, or similar articles, after being prepared as herein before shown, by alternate or simultaneous pressure, after the manner, or upon the principle, before specified.

WILLIAM C. GRIMES.

Decision in the District Court of the United States, for the Eastern District of Pennsylvania, in a case for repeal of Letters Patent.

JESSE DELANO, Jr. vs. JOHN SCOTT.

May term, 1834. } Scire Facias, to repeal letters patent.

This was an action of general interest, and one of some novelty in our courts; it was a proceeding by scire facias, under the tenth section of the patent law of 1793, brought to repeal the letters patent of John Scott, the defendant, bearing date the 12th day of November, 1830, which were for certain alleged improvements in fire proof chests, called the improved fire proof chests. The plaintiff alleged that the patent was taken out by the said John Scott surreptitiously, and upon false suggestion, and contained no improvement which had not been long known and used by Mr. Delano, and others. The cause came on for trial before his honour, Judge Hopkinson, and a special jury, on Wednesday, the 27th of May, and occupied the court, with the exception of one day, till the 3d inst.

It was proved, on the part of the plaintiff, that Jesse Delano, as early as the year 1828, had made and sold fire proof iron chests, embracing all the material principles and improvements enumerated in the patent of the said Scott. And it also appeared from letters patent, taken out by Jesse Delano, the 7th of March, 1826, for certain improvements, made by said Delano, in fire proof wrought iron chests, and in the locks and fixtures thereof, that said Scott had incorporated into his patent the main principles and features of said Delano's patent.

It also appeared in evidence, that, in 1827, Scott went to work as

a blacksmith in the factory of Mr. Delano, and continued with him about two years, and was employed by him, during that time, in making most of the iron work, and many of the very articles, for the chests then manufactured by Mr. Delano, under his patent, which the defendant patented after leaving his employment.

Scott left Mr. Delano in the fall of 1829, as he said, to go on to a farm in Ohio, but went to Montreal, and attempted the manufacture of fire proof chests there. He returned to New York in June, 1830, visited the factory of Mr. Delano, and proposed to a witness who had worked with him at Mr. Delano's, that they should procure one of his chests, take it apart, and use it for a pattern. Shortly after this, Mr. Scott came to Philadelphia, and commenced manufacturing fire proof chests, and in October of the same year, assured a gentleman who called upon him, that his (Scott's) chests were made in the same manner, precisely, as Mr. Delano's; that he had worked for Mr. Delano for about two years; had learnt the business while with him; that the materials he used were the same as those used by Mr. Delano to make his chests fire proof, &c.

On the part of the defendant, Mr. Scott, it was at first attempted to be shown, that the improvements enumerated in his patent were his own, and not the same with those enumerated in Mr. Delano's patent. But after the evidence was gone through, this ground seemed to be pretty much abandoned, and the counsel rested their defence mainly upon the alleged ignorance of Mr. Scott that he had included in his patent, improvements well known, and long used, by Mr. Delano, and which were enumerated in his patent of 1826.

The cause was delivered to the Jury by Judge Hopkinson, in a lucid and able charge, in which, after stating the principles of the patent law in general, and the different objects intended to be accomplished by the sixth and tenth sections, he explained particularly the nature and effect of the proceedings by scire facias, and entered into an examination of the patent of said Scott, and the testimony offered in the cause; he said the jury were first to inquire if Scott was the true inventor, or discoverer, of all he had embraced in his patent; if they believed that he was, there was an end of the case, and their verdict must be for him; but if he had embraced in his patent, and claimed as his, that which had been previously patented, (of which he intimated there was little doubt,) or if he had embraced in his patent, and claimed as his, that which was original, together with that which was well known, then the patent must be declared void, if this were a proceeding under the sixth section of the act of Congress, and a suit brought by Scott for an alleged violation of his patent; but that this was a different proceeding, and he should instruct them agreeably to the law, as stated in his opinion, on granting the scire facias, though he considered the point open for future discussion. He accordingly told them that the plaintiff in this case must go one step further, and not only satisfy the jury that the defendant had embraced in his patent, and claimed as his, that which was not new, and had been in use before, or which had been previously patented, but

that they must be satisfied that the defendant had done this *knowingly* and *intentionally;* if they believed he had done it through ignorance and mistake, their verdict must be in his favour. The learned judge then applied the evidence to this branch of the case, and commenced on the testimony that had been relied upon as tending to prove that the defendant knew he was including improvements embraced in Mr. Delano's patent of 1826, and said that if the jury should be of opinion that the defendant had claimed in all, or either, of the specifications of his patent, that which he knew was not his invention, but the invention of some other person, and which he knew had been known and used by others before, and had intentionally included it in his patent, then they must find for the plaintiff, and Scott's patent must be declared void.

The jury, after retiring to their room, returned a verdict for the plaintiff, thereby declaring the patent of said Scott void.

Perkins for plaintiff, Earl and Dallas for defendant.

Translations from Foreign Journals.

On various Modes of Imitating Bronze, translated from the Dictionnaire de l'industrie Manufacturiere Commerciale et Agricole; article, Bronzage. *By* M. H. Gaultier de Claubry.

[Translated for this Journal, by Wm. W. Smith.*]

A bronze colour, varying according to the nature of the substances used to produce it, and approaching more or less to the natural tint, is given to many articles of plaster, wood, paper, or pasteboard. A very brilliant bronze is produced by gold leaf rubbed on a muller, with honey or gum; goldbeaters' clippings are used for this purpose. *Aurum musivum* may be employed for the same purpose; one part of this, and six of calcined bones, must be finely pulverized; a small quantity is taken on a moistened rag, rubbed over the article to be bronzed, which is then scoured with a dry piece of linen, and submitted to the burnisher.

When aurum musivum is to be fixed on paper, it is powdered without the calcined bones, and mixed with the white of eggs, or a light varnish of alcohol; this mixture is applied with the brush, and the article is afterwards burnished.

When a plate of iron is immersed in a diluted and boiling solution of sulphate of copper, the copper is precipitated in the state of a powder, which can be easily washed by agitating it with water. This powder, mixed with six times its weight of calcined bones, also in fine powder, may be substituted for the preceding mixtures.

It is sometimes desirable to give articles a grey colour, nearly resembling that of iron; this is called white bronze; it is produced by several methods; Argentum musivum gives a very pretty tint; tin reduced to an extremely fine powder, (by pouring it, while fused, into a box, the interior of which is well covered with pulverized chalk, and shaking until perfectly cold,) is also used. This powder,

* At the request of the Committee on Publications.

sifted and mixed with a solution of glue, is applied to the article, which takes a dull colour; if brilliancy is required, the burnisher must be employed.

Argentum musivum is an amalgam of equal parts of bismuth, tin, and mercury.

When plaster is to receive the white bronze, it is rubbed with plumbago.

Well cleansed cast iron, dipped into a weak solution of sulphate of copper, becomes coated with copper, which adheres to its surface; under these circumstances, the copper assumes a reddish hue, which passes to yellowish brown.

Bronze, exposed for some time to the action of the atmosphere, is covered with a very thin coating of carbonate, which gives it a green hue, known by the name of "patine antique." Imitations of this tint have been attempted in various ways; but, however great may be the resemblance of these artificial colours to those produced by time, there are still certain characteristic shades, which a practised eye can easily detect; the antiquary should not, therefore, complain, since it is always possible for him to distinguish an "antique" from an imitation.

The hue of antique bronze is given to bronzed articles intended for house ornaments, or to medals, by treating their surfaces with different compounds. A great number of these mixtures have been recommended; many of them answer sufficiently well; but the beauty of the product depends very much on the manner of applying them, for different workmen, using the same composition, obtain very different tints.

We will here merely enumerate some mixtures with which our best workmen produce handsome colours.

The metal having been well scoured with nitric acid, the compound is very uniformly spread over its surface, with a proper linen roll, or brush.

The bronze colour obtained, whatever may have been the mixture employed to produce it, will depend on the nature of the alloy; since the alloys used for casting the ornamental articles which are to be bronzed, vary, it follows, of course, that the same bronzing mixture, applied in the same manner, cannot, in all cases, produce the same tint.

Nitric acid, diluted with two or three parts of water, is rubbed over the metal; the colour is at first greyish, but soon becomes greenish blue.

A solution of one part sal ammoniac, three carbonate potash, six of common salt, and eight nitrate of copper, in twelve parts of boiling water, is rubbed at intervals on the metallic surface; the tint is unequal and harsh, but it softens, and becomes more uniform.

A beautiful greenish blue bronze may be obtained by washing a copper surface, with concentrated aqua ammoniæ, for a sufficient length of time.

The base of nearly all the compounds employed, is vinegar and

sal ammoniac. Thus, skilful workmen use nothing but a mixture of sixty grammes* sal ammoniac, and a litre† of vinegar.

Another mixture, which gives good results, is composed of thirty grammes sal ammoniac, eight grammes salt of sorrel, and ten litres of vinegar.

An experienced chaser of Paris uses a mixture of 15 grammes sal ammoniac, 15 grammes common salt, 30 grammes spirit of hartshorn, 1 litre vinegar.

One litre vinegar, 15 grammes sal ammoniac, 15 grammes common salt, and 15 ammonia, form a good mixture. A soft brush is dipped in the mixture, and the article is rubbed with it until it takes a handsome bronze tint; the piece should be barely moistened, and any excess of liquid should be removed by another brush. If, after two or three days, the tint is found to be too pale, the process is repeated. The work may go on in the air, the colour takes better; the copper need not be heated.

The two following compounds produce a handsome effect:

Eight grammes sal ammoniac, eight grammes common salt, sixteen grammes ammonia, one-half litre of vinegar.

Two grammes salt of sorrel, eight grammes sal ammoniac, one-fourth litre of vinegar.

The mixture is applied with a brush which is almost dry, and the operation is continued until the desired tint is obtained. These compounds produce a better colour when the process is conducted in the sun.

Medals are coloured in a different manner; they are immersed in a liquid, the composition of which varies much.

Five hundred grammes of powdered sub-acetate of copper, are thoroughly mixed with 333 grammes sal ammoniac, also in powder; make a paste of this, with one part of a glass of vinegar. Take a piece of paste, of the size of a walnut; mix it with the remainder of the vinegar, and a litre of water; boil it for a quarter of an hour; allow the solution to repose, and decant the clear liquid. To bronze medals, pour some of this boiling liquid over them, continue the ebullition for five or six minutes, decant the solution, and wash the medals perfectly clean. The same liquid cannot be used more than five or six times; at each time, a quarter of a glass of vinegar must be added. The process must be carried on in a copper pan; the medals are to be fixed on small blocks of wood, so that they cannot come into contact with the pan, or with each other.

The medals should be well wiped immediately, that the tint may not change; then dried with care, and subjected to the burnisher, to render them bright.

It almost always happens that some of the pieces take a bad tint; very often some are spotted.

A mixture of 510 verdigris, 250 sal ammoniac, rubbed with vinegar on a marble slab, and transferred to well closed vessels, is used

* A gramme is equal to 15.4 grains.

† A litre equals 1.76 imperial pints.

in the same way; a piece is added to a glass of vinegar, and two litres of water, and the whole boiled for ten or twelve minutes.

A good bronzing mixture for alloys of lead and tin, consists of 100 parts of nitrate of copper, perfectly pure and neutral, in a solution at 18° of Baume's hydrometer, and 20 parts sal ammoniac; this liquid must be applied so as to wet the metal as little as possible.

We will here detail the Chinese process of bronzing, as it is a curious one:

The copper is washed with vinegar and ashes, until it becomes perfectly bright; it is dried in the sun: 2 parts verdigris, 2 cinnabar, 5 sal ammoniac, 2 duck's bills and livers, and 5 alum, are to be finely pulverized, and well mixed; a liquid paste is made with this mixture; the copper is covered with the paste; it is then heated, allowed to cool, and the paste removed; this is repeated eight or ten times. The copper assumes a pretty tint, which is so durable that the action of the air and rain does not impair its beauty. A mixture of 1 part sal ammoniac, 3 cream of tartar, 3 common salt, 12 hot water, and 8 of a solution of nitrate of copper, gives a good bronze. By increasing the quantity of common salt, the colour becomes clearer, and approaches to yellow; by diminishing the proportion of the same, or omitting it altogether, different shades of blue may be produced. The action is increased by adding a greater proportion of sal ammoniac.

Certain articles are bronzed red by coating them with oxide of iron, and exposing the pieces to heat; the same tint may be given by rubbing them with a liquid containing $\frac{1}{30}$ sulphuret of potassium; the colour readily changes to greenish brown.

Gun barrels are bronzed by being rubbed with fused chloride of antimony; this must be repeated several times; to obtain a successful result, the barrels must be gently heated.

MM. d'Arcet and Thenard proposed a cupreous soap, with which, when plaster is impregnated, it assumes so much the tint of ancient bronze as to deceive the eye, and its real character can only be ascertained by touching it.

Pure linseed oil is converted into a neutral soap by caustic soda; to this a strong solution of common salt is added, and the whole is boiled until the liquid has a great specific gravity, and the soap swims at the surface in small grains; the solid matter is to be drained and pressed, to rid it as much as possible of the fluid; dissolve this soap in distilled water, and pass the solution through linen; dissolve also in distilled water, 80 parts sulphate of copper, and 20 parts sulphate of iron; filter, and into the latter solution pour the solution of soap, until decomposition is complete. A little sulphate is now added, and the whole stirred several times at intervals, and then boiled; in this way, the soap is mixed with an excess of sulphate. It is washed first with a large quantity of boiling water, next with cold water, and thrown on a linen, pressed, and dried as much as possible.

Boil a kilogramme* of pure linseed oil, with 250 grammes of pure

* 2.2 avoirdupois pounds.

and finely powdered litharge; strain through a linen, and allow the oil to stand in a stove; it clarifies much better there.

Fuse together in a delft-ware vessel, on a steam or water bath, 300 grammes of boiled linseed oil, 160 soap of copper and iron, 100 pure white wax, and keep the mixture melted some time, to deprive it of moisture. Heat the plaster in a stove to 80° or 90° Centigrade, and apply the fused preparation; when the plaster has become so cold that the mixture will no longer penetrate it, it is again placed in the stove, and heated to 80° or 90° Cent.; more of the mixture is applied, and this operation is repeated until the plaster has absorbed enough; it is then again placed in the stove, to deprive its surface of colour; the porosity of the plaster is such that the mixture penetrates it without leaving the finest lines soft, and this result is obtained by no other method; the depth to which the preparation sinks, is greater or less, according as the piece has been placed a greater or less number of times into the stove.

When the article has absorbed a sufficient quantity of the soap, and has taken the required tint, its surface is gently rubbed with a bunch of cotton, to give it the necessary brilliancy; and if it is desired to imitate natural bronze exactly, a small quantity of shell gold is applied to the raised parts. It sometimes happens that flaws, and other defects, render it necessary to insert a piece in statues; the tint of these pieces never exactly resembles that of the surrounding bronze; this effect is perfectly imitated by cutting out a piece of plaster, and running some other plaster into the cavity; the tint of the replaced part differs from that of the mass, and resembles exactly the defect in real bronze.

This process affords the means of obtaining articles of plaster resembling very closely those of real bronze; medals, busts, and even statues, may be finished in this way, provided a stove of suitable dimensions can be procured; the process presents some difficulties, and to these many have yielded; we will mention them for the sake of those about to engage in this art, to show them the faults of others, and furnish them with the means of surpassing their predecessors. It should first be stated, that, with proper care, this process affords most satisfactory results. M. d'Arcet himself prepared some articles, which were taken for bronzes of superior beauty, by skilful artists; the same success may attend operations on a larger scale.

When the plaster is moistened unequally, it does not absorb the soap uniformly, because the porosity of the parts is not equal; the consequence is, that the surface takes various tints; when the pieces are small, this defect need not be feared; but when they are busts, or castings, of large size, it frequently happens that contiguous parts take very different shades of colour, and spots will sometimes be perceived very slightly, if at all, altered by the process.

The occurrence of these blemishes may be avoided by carefully casting the pieces to be bronzed, expressly for this purpose, and ascertaining, by a few trials, what quantity of water must be used, in order that the cast may assume the finest shade; with these pre-

cautions, the process may be conducted successfully, even on a large scale.

The small pieces are dipped into the melted compound, then shaken, and dried on one side, to cause the absorption of the composition remaining on the opposite surface; this may also be accomplished by exposing the surface to a bright fire. A gilder's chafing dish must be used for large articles.

A variety of articles, such as time-pieces, vases, &c., may in this way be manufactured, which resemble very much handsome ornamental bronzes, and can be sold at low prices; it is only surprising that this art is not cultivated to a greater extent, as these ornaments might, by a little perseverance, be introduced into general use. Plaster, finished in this manner, may be exposed to air, moisture, or even rain, without being injured.

On the Obstruction of Cast-iron Water Pipes, by the formation of Nodules of Oxide of Iron within them. By M. Payen.

(Translated for this Journal, by Jos. Wharton.*)

A singular effect has been lately observed to take place by use in cast-iron water pipes, in certain cities. The passage of the water becomes gradually obstructed, by the formation of nodules of impure oxide of iron, of a light brown or greenish colour, which adhere to the internal surfaces of the pipes.

This subject being one of the greatest importance in connection with the health of cities, and the agriculture of various districts, required an elaborate investigation, which I undertook, and of the results of which, the following is a succinct account.

All soluble substances that give an alkaline reaction to water, such as potassa, soda, ammonia, and lime, the carbonates of potassa, of soda, and of ammonia, the borate of soda, and the sub-acetate of lead, are capable of preventing the oxidation of iron.

The relative proportions of these substances, and of the water, required to produce the effect, varies with the alkaline agent employed, and is also affected by the presence of certain foreign salts; the alkaline agents being the same, the nature and quantity of these salts determine the proportions.

When the quantity of alkaline matter is insufficient, oxidation ensues; but it is remarkable that all the points of the surface are not, in this case, equally oxidized, so that the nodular form of the concretions must be assumed from the beginning. The preserving force is overcome only in places where the continuity of the surface has been interrupted, even although it be by an almost imperceptible division. Thus, for instance, the lines on fibrous iron, and the points where the parts of the iron are separated by foreign bodies, are oftentimes pointed out by traces of greenish oxide, which gradually fill up, while the rest of the surface preserves, for a long time, its me-

* At the request of the Committee on Publications.

tallic aspect; and hence the advantage of an iron as *mechanically* pure as possible. The points of contact between a connecting pipe, and the sides of a main, or between two pipes, are likewise sufficient to determine the effect.

The following are a few experiments upon these points.

A cylinder of polished iron, immersed in a saturated solution of pure potassa, diluted with 1000 times its volume of water, (the temperature being 59° Fahr.) was preserved untarnished for a long time; but as the carbonic acid of the air gradually weakened the intensity of the alkaline action, signs of oxidation began to exhibit themselves at various points, and became more and more apparent, while the greater part of the surface preserved its lustre after the lapse of a year.

Conical concretions of oxide were gradually formed on the surface of an iron cylinder, when the latter was immersed in water containing 0.02 parts of its volume of a saturated solution of carbonate of soda. The colour of these concretions was a greenish brown, which acquired a yellowish cast at their summits, while the base in contact with the metal retained its original greenish brown colour. The liquid was not protected from the air.

The same saturated solution being used, but diluted with fifty-nine parts of water, and kept for a year, in an open tube, in contact with polished cylinders of iron, greenish concretions were first formed, which slowly passed round the cylinders, and gradually assumed a beautiful yellow tint, whilst the rest of the surface, even of that part which, by the evaporation of the liquid, was uncovered, preserved its metallic state. In the same circumstances, the iron has been completely preserved from oxidation in water containing 0.023 of a saturated solution of carbonate of soda.

In a saturated solution of chloride of sodium,* protected from the air, there appeared, on the surface, and, it is to be particularly observed, *on the points of contact* between several bars of iron, only some protuberances of greenish oxide, the remainder of the surface preserving its metallic lustre after the lapse of a year. In a similar experiment made in contact with the air, the oxidation continued, and assumed the colour of rust, beginning with the parts nearest the surface of the liquid.

A solution saturated with marine salt, and carbonate of soda, preserved iron entirely from oxidation, for the same space of time, notwithstanding the presence of atmospheric air, and a crystallization of a part of each of the two salts.

The same solution, diluted with nine volumes of water, afforded concretions of oxide.

In endeavouring to obtain, in accordance with the above experiment, the exact proportions of water, of chloride of sodium, and of

* (1) In making a saturated solution of chloride of sodium, in water of the Seine, the liquid suffered a contraction equal to 0.03 of its volume, and disengaged 0.015 of the same volume, of gases contained in the water. The temperature was 59 Fahr., and the pressure 30 inches.

carbonate of soda, the most favourable to the formation of local concretions of oxide, I found that a saturated solution of the two last, (the solution being made at the temperature of 59° Fahr.) diluted with seventy-five times its volume of water of the Seine, (see note 3,) and filtered, produced, in less than a minute, an oxidation both on wrought and cast-iron. The effect was first shown by the appearance of points of a pale green; in ten minutes' time, the lines were well defined.*

When, in compliance with a suggestion of M. Becquerel, the power of electric conductibility was increased, by bringing, by means of a wire, a fragment of well calcined charcoal into contact with a polished bar of wrought or cast-iron—the other circumstances being the same as in the preceding experiment—the greenish protuberances were developed still more rapidly, and in much greater number.

In weak alkaline solutions of the same substances, freed from atmospheric air, oxidation does not ensue.

In those containing atmospheric air, oxidation is arrested when the access of the exterior air is prevented.

When the air of the atmosphere has free access, the concretions nearest the surface pass into a higher state of oxidation, while the greenish oxidation continues, at other parts of the surface, on the points at which it began.†

The figure of the concretions is sometimes irregularly rounded, sometimes conical, and, at times, variously ramified into winding bands.

Bars of wrought and cast-iron, polished, which have been, for the last four days, immersed in water, that had previously stood in contact with a portion of white marble, in the form of a well washed powder, already exhibit, near the surface of the liquid, points of a greenish oxidation, and rust in a floculent state.

The following conclusions may be drawn from the preceding facts, and others not mentioned.

1. That all solutions, having a slight alkaline reaction, may, while the *general surface* is preserved, occasion the formation of local concretions of oxide, at *certain points* of the surface of iron immersed in them.‡

* (2) The chloride of sodium, when present by itself, in small proportions, in water, determines, on the surface of polished iron, local oxidations, which remain greenish coloured the longer, and preserve the remainder of the surface the better, accordingly as the iron is farther removed from the surface of the liquid in contact with the air; but these oxidations do not assume the nodular form.

† (3) In all the preceding experiments, made with a view to their practical application, the water used was taken from the river Seine, and filtered after its mixture with the alkaline solution, and the subsidence of the precipitate, (which fell in consequence.) The temperature during the experiments varied from 59 to 62.6, and from 68 to 69.8, Fahrenheit. Several of these experiments, repeated with the use of distilled water, gave the same results, when the proportions of the alkaline substance, of the atmospheric air, &c., were the same.

‡ (4) Wrought and cast-iron, half immersed in a weak ammoniacal solution,

That the general character and rapidity of this process varies with the presence, and according to the proportions, of atmospheric air, and different salts, that may be brought into action, and is further determined by the presence of breaks in the continuity of the surface of the metal immersed, whether these interruptions exist in a single piece, or at the lines of separation between different pieces of iron, or even between the latter and other substances.

3. That acid solutions determine a uniform, and less bulky, oxidation; on copper, both acid and alkaline solutions determine a general oxidation.

Local concretions must then be expected to ensue in wrought or cast-iron pipes, when exposed to a current of water slightly saline, and having a feeble alkaline reaction. In such case, it will be necessary either to abandon the use of this metal, or at least to contrive convenient places of access to the pipes, at short distances from each other. In this case, owing to the minute state of division of the particles, and the granular formation of the concretions, the obstruction may be removed by the application of a gentle friction, or by the assistance of a diluted acid, too weak to injure materially the metallic parts.

Note by the Translator.

The general properties developed in this paper, as belonging to all alkaline solutions, are considered by the author to present a new series of electro-chemical actions to the attention of the scientic chemist.

Remarks in relation to some new Concretions, produced artificially on Iron. By M. Payen.

In a recent paper, the results of which have been verified by MM. Becquerel and Dumas, I made known a method of forming the protoxide and peroxide of iron, in the shape of nodular concretions, on certain points of the surface of iron,* while the remainder of the surface preserves unchanged its metallic state.

An investigation, having its origin in the electro-chemical theory, and the properties of alkaline solutions, has led me to the discovery of another kind of local concretions, produced by a series of still more complicated reactions.

A polished cylinder of soft iron was kept immersed, for a year, in a close vessel, in a solution of sub-acetate of lead, and consequently exposed to the influence of an alkaline reaction; for a short period, no signs of oxidation were observable, but it afterwards became stud-

were preserved, by the vapour of the ammonia mingling with the air above the liquid, during all the variations of temperature throughout the year. The solution contained 0.1 of ammonia. All the above mentioned concretions are composed of a mixture of hydrated protoxide and peroxide of iron; the proportion of the latter slowly increases.

* The preceding paper is the one referred to by the author.—*Trans.*

ded with a number of spongy, greyish excrescences, which presented themselves on a line parallel to the axis, (see preceding paper.) The remainder of the surface of the iron preserved, unaltered, its original appearance.

The concretions were made up of small particles, aggregated in the form of a metallic sponge, that presented the appearance and ductility of lead.

A slight friction was sufficient to unite the particles when separated, and to give the mass the brilliancy of that metal.

When flattened together under a slight pressure, and heated in a tube out of contact with the air, they melted, and hardened, on cooling, into a dross, that possessed all the properties of lead.

The liquid itself remained limpid and colourless throughout the year; afterwards, when exposed to the air, it quickly assumed a yellowish brown colour, which gradually deepened; it still possessed a feebly alkaline character.

A portion of the liquid being treated with sulphuric acid, acetic acid was developed. Another portion, by the action of a soluble sulphate, gave a precipitate of sulphate of lead, and the supernatant solution had all the properties of the salts of iron.

The tube in which the solution, and the immersed iron, were enclosed, contained, then, evidently, the following substances, present, at the same time, together.

1, sub-acetate of lead; 2, metallic iron; 3, lead, in the form of a concretion; 4, acetate of iron, partly acetate of the peroxide.

It appears to me to follow, from the preceding facts, that, at the points where, by the presence of foreign bodies, and interruptions in the continuity of the surface, the elements of a pile are constituted, the iron is oxidized at the expense of the oxide of lead, the latter metal being revived, and aggregating in concretions, at the same points, while the oxide of iron, united to its equivalent of acetic acid, diffuses itself in the liquid.

By the continuance of the same series of reactions, the volume of the concretions is augmented, while, by the alkaline reaction of the undecomposed sub-acetate of lead, the rest of the surface of the iron is preserved from oxidation, and is thus enabled to maintain its metallic lustre.

Report to the Directors of the London and Birmingham Railway Company, accompanied by Experiments on the Transverse Strength, &c. of Malleable Iron, with reference to its use for Railway Bars. By Peter Barlow, *Prof. Royal Mil. Acad., Woolwich.**

The accompanying paper contains the details of the experiments I have made, in conformity with the resolution of the general meeting of the proprietors of the London and Birmingham Railway Company,

* We are indebted to a member of the Institute, Gerard Ralston, Esq., now in London, for the opportunity of presenting thus early to our reader, the inte

held at Birmingham, on the 13th of February, and I am in hopes several important data and rules have been thus elicited. These will be found in the paper referred to; but it may be convenient to state the results in this place, referring to the paper for the experiments and investigation on which they are founded.

It has been ascertained that a malleable iron bar of any length is extended $\frac{1}{10000}$th part of its length by a direct strain of a ton per inch on its sectional area; and that, when strained with ten tons per inch, or when stretched $\frac{1}{1000}$th part of its length, its elasticity is injured, and the bar will not return to its original state.

Now, as the contraction of iron, between summer and winter, amounts to $\frac{1}{2000}$th part of its length, it follows, that the bars cannot be fixed permanently to the chairs and blocks, without great danger of drawing so much upon their strength, as materially to impair their efficiency for bearing a great passing load.

It follows also, as a consequence, that if the rails and chairs must not be permanently fixed to each other by direct means, it ought not to be attempted by indirect means, viz: by cotters, keys, or wedges; for either these will hold the rails to the chair, or they will not. If they do hold fast, they produce all the mischief which permanent fixing would occasion; and if they draw, then they do no good, although they may still do mischief; whence I am led to conclude, that the rails should have no greater attachment to the chairs than is sufficient for preserving them steady while the load is passing.

My next experiments were directed to finding the position of the neutral axis in malleable iron, for without this datum, the strength of rails, of differently formed transverse sections, cannot be computed and compared with each other, at least, without the expensive mode of having them first made, and then their strengths found by experiment. In this inquiry, as in the preceding, I have succeeded to my entire satisfaction, and, by the results obtained, have formed rules of very simple character, which will enable any person to compute with great precision the bearing strength of a bar of any proposed section within the limits of its elastic or restoring power, and also the amount of the deflection it will sustain under this or any lesser load. I have demonstrated by these means, that we may find certain practicable forms of parallel rails, which shall be, weight for weight, equally as strong as the fish-bellied rails, when loaded at their middle point, and, of course, stronger in every other part. For which reasons, and for others explained in my paper, I feel fully convinced that the parallel rail, formed according to the requisite proportions, is decidedly the best.

Such are the results of my experimental researches on this subject, and here, perhaps, I ought to close my report, leaving it to practical men to work out the conditions I have shown to be necessary; but I hope I may be allowed to offer some suggestions on a few prac-

resting and very practical report of Prof. Barlow, the publication of which is commenced in our present number. We beg leave to return our thanks to Mr. Ralston, to whom we have before had occasion to make acknowledgments for a similar favour.—Com. Pub.

tical points,—a task for which I feel myself the better qualified, by being a week associated with Messrs. Rastrick and Wood, in examining the models sent in for the prize, and thus benefitting by their practical skill and remarks; to which I may also add, the advantage I derived from examining so many models, several of them exceedingly ingenious, and accompanied with descriptions, containing very sensibly remarks on different modes of practice.

In the first place, as I have already stated, I am decidedly convinced that the rail should be parallel; that its whole depth should not be less than four and a half or four and a quarter inches; that the thickness of the middle rib should not exceed that, which is essential to the perfect manufacture of the bar; and that the lower rib, (without any reference to the distant contingency and dangerous proposition of turning the rail,) should be made of the best form for present purposes, viz: for giving to it a steady bearing in its seat.

With respect to the joint chair, I do not think any better form can be devised than *the whole* chair proposed by Mr. Daglish, viz: in which he uses no filling-up piece, but with a different wedge. It is my opinion, that, by well gauging both the ends of the rails and chairs, and then leaving the former free, we should best comply with the conditions I have endeavoured to show to be desirable, if not absolutely necessary.

To carry this into practice, however, so as to enable the rail to be removed, if necessary, it is essential that the pin, which holds the chair to the block, should be allowed to fall down into the stone, for which purpose the lewis-pin, proposed by Mr. Swinbourn, is well suited; but still I think that, combining this ingenious idea of fixing, with that proposed by Mr. Vignoles, a better effect might be expected; that is, instead of the lewis, I should recommend the large-headed bolt, with or without a loose washer, to cut a hole in the back of the block to the depth of about two inches, up which the head of the bolt may be passed, which would allow it to be dropped down when necessary, and admit of application in a more simple, and probably in a more effectual, manner than the lewis, if, as I have been informed, the latter is liable to split the block.

For the intermediate chairs, I think a slight modification of Mr. Stephenson's would best answer the purpose; that is, I would support the rail in the chair simply by the ends of two plain-ended pins, so as to give it the requisite steadiness with as little friction as possible. Of course, I would have these pins pointing horizontally, or upwards, instead of downwards, as they do in the chair in question.* I do not conceive such pins would be necessary in the joint chair, but provision might be made for them, and they could be applied, if necessary.

I have no doubt, practical men, who have taken a different view of this subject, and have thought it necessary to fix every thing as fast

* It may be worth consideration, whether, if this mode of fixing were adopted, it would not be practicable and advantageous to introduce pieces of felt, or other substance, within the seat of the chair, which would greatly subdue the jars that take place between metal and metal.

as possible, will see objections to the light fixing I have proposed; but without attempting to anticipate and answer those objections, I can only say, after having, I believe, heard every thing that can be advanced on the subject, that my opinion is such as I have stated.

I have, above, alluded to the gauging the ends of the rails, and the openings in the joint chair, and I have also spoken in the description of my experiments, of the advantage of keeping the blocks of the two lines of rails parallel. On all these points, it is probable I shall be considered by many as entering into refinements neither called for, nor practicable, in the case of rail-ways; but I would ask, why is it found that so much breakage takes place, and that so many repairs are rendered necessary? There is no theoretical reason why a heavy load, passing with great velocity, should cause more damage than the same load passing slowly, if the road were perfect; the mischief, therefore, is in the imperfect practical execution, and the disregarding small inequalities, as we would disregard them in common cases. It has, perhaps, never occurred to such persons, that a difference of level at a joint chair, between the two abutting rails, of only one-tenth of an inch, will, when the carriage is moving from the higher to the lower level, at its greatest speed, cause the wheel to pass the distance of a foot without pressing on the rail, and, consequently, throwing the whole weight, which ought to be borne equally by the two rails, wholly upon one; yet this is a fact resting on a natural law, and cannot be otherwise. To fall one-tenth of an inch by the action of gravity, requires one-forty-fourth part of a second, and in that time the carriage will have advanced a foot; consequently, for that space, the carriage has been borne by one rail only. It may be said there are springs provided, which assist gravity to bring down the wheel. I am afraid, however, after allowing for their inertia, that such aids are very inefficient; at all events, they furnish no arguments against having every thing as accurate as possible. Again, with reference to the abutting rails, I was certainly surprised when a gentleman officially attached to the Liverpool and Manchester Railway, informed me that, in some parts of their line, the rails were half an inch apart, and that it was not thought injurious. But why, I would ask, whether injurious or not, have them half an inch apart, when they never need be open above one-tenth of an inch, and, for more than half the year, not above one-twentieth of an inch, if proper care be taken in laying them down? Hitherto an idea has prevailed, that in laying down the rail, one-eighth or one-tenth of an inch must be left for expansion, and, whether hot weather or cold, the same allowance is made; consequently, if the rail is laid in the summer, the one-eighth of an inch becomes nearly a quarter of an inch in the winter, provided the contraction takes place in the same direction in two adjacent rails; but if in a contrary direction, it becomes half an inch, or nearly so, as my informant states the fact occasionally to be. To prevent this, I would, as stated in my experiments, have each rail fixed to one chair, and to one chair only; and I would have three steel plates, the thicknesses of the proper spaces, to be left between the rails, according to the temperature—one between 15°

and 35°, another between 35° and 65°, and another for all temperatures above 65°, whereby to regulate the distances of the rails. This, again, will, I have little doubt, be considered an unnecessary refinement; but to such objections I reply, that this accuracy costs nothing additional in the execution, and may, therefore, at all events, be as well attended to as not.

It only remains now for me to make a few observations upon the absolute requisite strength of the bars, and the tests of strength to which they ought to be submitted, before they are reported, and received as efficient.

First.—With respect to their absolute strength, the amount of this will depend upon the weight of the locomotive intended to be employed, which I shall here assume at twelve tons; and, notwithstanding six wheels may be used, I shall, for the sake of being on the safe side, consider only four, or that each wheel bears one-fourth of the whole weight, or three tons. I will also suppose that, whether my suggestions are acted on or not, cases may occasionally occur, when the weight, which ought to be borne equably on two rails, is, from irregularities in the road, thrown all on one. This gives the greatest bearing load six tons, and I would then have a surplus strength of fifty per cent., making nine tons; that is, I would have rails whose absolute elastic or restoring power should be nine tons, and I would test every rail to seven and a half or eight tons. Such a test would be perfectly harmless on bars of good iron, and, unless it is carried thus high, it is impossible to detect bars made of an inferior quality, which show more stiffness in the commencement than the best iron; but their elastic power at length yields suddenly, and the bar becomes useless. Such iron should, of course, be excluded, unless indeed it be contracted for, and the rails proportioned accordingly. This testing should be carried on in the line of works by a proper person, and the manufacturer left free to use his own plans without superintendence, as practised by the admiralty in the receipt of their iron cables. There can be no doubt that, if the cables were sent to sea without proof, and every failure of a link attributed to a want of sufficient dimensions, before this time we should have had cables for the several rates of vessels of much larger bolts than at present, thereby adding, at a great expense, much unnecessary and even injurious weight, as appears to be the tendency of the present practice in railway bars.

The proof I would recommend is as follows: On the line, near the place where the work is going on, all the intermediate chairs, in one length of rail, should be removed, and over this space, the bar for trial should be placed. A carriage, then, rightly adjusted for weight, and with wheels at a proper distance to bring the requisite strain on the metal, should be passed over twice, when, if no permanent deflection be observed, the bar is to be considered sound, and removed, and its place supplied by another, to undergo the same test. In this way, I consider that fifty or sixty bars a day may be tested at a very trifling expense; but it should be done under the superintendence of a person on whose report reliance may be placed, and to whom the other minutiæ I have mentioned might also be entrusted.

I mention this because, if the plan be acted upon at all, it should be followed up strictly, as well in justice to the company and iron-master, as to the proposition itself.

When the laying down has proceeded a certain distance, the chairs may be replaced, and those of another rail removed, to form a new testing ground nearer to the point of active operations.

I have considered the other suggestion for testing by percussion, but do not think it would be recommendable.

For the gauging, I would recommend an over and under gauge, according to the plan followed by the Ordnance Board, in the receipt of shot and shells.

I think it is possible, by a slight modification of the form of rail I have comprised in my fourth example, to give to it a strength of nine tons, without any increase of weight. I have allowed rather more metal for the head, I believe, than is generally employed, which, if transferred to the lower rib, would give all the additional strength required, or, perhaps, the centre rib might bear a slight reduction. At all events, leaving every thing as it is, except adding two pounds per yard to the bottom rib, the rail would come up to the whole strength of nine tons, as required. And here, I would observe, is the great advantage of working by rule rather than by opinion, for if we had only the latter to guide us, we should be hard to believe that an increase of one-twenty-fifth in the weight could be made to add about one-ninth to the strength and stiffness of the bar; yet such is unquestionably the case.

In conclusion, I feel it my duty to state, that, through the liberal permission of my Lords Commissioners of the Admiralty, I have had every convenience I could desire for conducting the experiments; that the London Committee have caused to be supplied every instrument and material I had occasion for; and that I have been much indebted to Messrs. Lloyd and Kingston for their cheerful assistance, and ingenious suggestions on various occasions. On my own part, I will only say, that I entered upon the inquiry without prejudice; that I have made the best use in my power of the means placed at my disposal; have faithfully recorded every result as it was noted down at the moment of observation; and that I am in hopes the laws and rules I have deduced are legitimate, and may be found useful, by enabling practical men to compute results which they have hitherto been only able to conjecture.

[TO BE CONTINUED.]

¶ *Remarks on Competition Plans for Buildings.*

Every person, whose attention has been in the least degree directed to architecture, must have observed that, in the present day, the practice of procuring plans for buildings, by public competition, is becoming more and more prevalent. It is, perhaps, only of late years that this custom has been generally acted upon; and it is more commonly employed in the case of public buildings, than in those of

a private nature. When a public building is about to be erected, the parties advertise a description of what is wanted, offering, generally, a premium for the best plan, or for that which shall be finally adopted. Sometimes the successful competitors have nothing for their reward but that of being employed to conduct the work, for which they are paid as in ordinary cases. The plans submitted are, or should be, distinguished by a private mark, referring to a sealed letter sent by the competitor, in which his real address is to be found; and it not unfrequently happens that there will be from forty to fifty of such plans sent in, varying, of course, in equally numerous degrees of merit. Not a few of these drawings are the result of great labour, seldom occupying the time of the competitor for less than three weeks, and, if the building be very extensive, and the design well matured, having employed his sole attention for months together. The unsuccessful competitor, consequently, sustains a very serious loss; as he is not like the landscape or figure painter, who can carry his drawings to the market; the plans of the architect can be of no use but for the purpose for which they were originally intended. In fact, there cannot be, in any other profession, a competition which requires such a sacrifice on the part of the competitor, as in architecture; and, were this sufficiently impressed on the public mind, there can be no doubt but the labours of the architect would, in all such cases, be more duly appreciated, and, at least, rewarded with an impartial distribution of justice.

It may here be remarked, that sufficient time is seldom allowed by the advertisers for preparing the plans; for it will be confessed by every architect, that the faults of his composition will be easier detected by himself, after it has been laid aside for a time; we should say, therefore, that six months, at least, should be given, or even a longer period, according as the subject may require.

Although the system of competition in architecture is accompanied with no small expense to the parties competing, yet it cannot be denied that, when rightly conducted, it is conducive to the greatest advantages to the public, and is the only true method of eliciting the brightest talents of the country, especially when the premium held out is of sufficient value to induce proficient architects to come forward with their works; and, surely, the erection of a building which is destined to continue for ages, standing forth to posterity as an example of the architectural genius of our time, is not unworthy of the most assiduous attention. The practice has also a beneficial effect, in affording to a young architect facilities, which he could not otherwise possess, of pushing himself forward. Private competition plans are sometimes required, where the competitors are previously chosen out, and where all are paid a certain amount for their trouble, whether successful or not; this is certainly the most liberal method, and should be adopted where the funds are sufficient.

In most cases where a decision is made on competition plans, the judges consist of men who are but indifferently qualified for the task, and whose fancy is easily carried away by a gaudy picture, the intrinsic merits of which they are incaple of appreciating; or, perhaps,

by a design which has nothing else to recommend it but that of being so commonplace in its character, as to be more familiar to their ideas than one of higher pretensions. Indeed, it is not to be supposed that men, whose pursuits of life are so totally unconnected with the subject, as never even to have led them to the inspection of a simple plan of a house, should be able to form a correct judgment of a number of elaborate drawings. It often happens, indeed, that the judges are so bewildered with the brilliant display before them, that they readily give way to some almost equally ignorant but pretending builder, to whom they look up as to the architectural oracle of their body, and who, it may be supposed, will not let slip such an opportunity of serving his own ends. This may, perhaps, be thought rather an uncharitable conclusion; but. certainly, there is but too much reason to fear that sinister influences have, in many cases, had an undue weight, and it is the particular object of this article to point out these grievances.

On such occasions as that we are just referring to, the most obvious method of proceeding, and that which would be the most entirely free from all suspicion of partiality, would be, to name two or more architects, of acknowledged celebrity in their profession, (and residing at a distance,) to whom the plans should be sent for final decision. Care should also be taken by all judges, in forming their decision, to keep in mind the terms of the competition; for, although the value or cost of the building required by the advertisement be strictly attended to by some competitors, yet there are others who will disregard it, and will produce an elegant design, although its expense should be double the stipulated estimate, and who, by this trick, may blind the judgment of the umpires, and carry off the prize.

The undue means which are sometimes resorted to by competitors to forward their own cause, are disgraceful in the extreme; some have been known openly to carry about their designs, for the purpose of procuring votes, before the general election; some unfairly attach their names to their plans, (instead of using a private mark, as they ought to do,) in the hope that their friends may exert undue influence in their favour, or from a vain confidence in their own importance, which leads them to expect that the name alone will produce a favourable impression; and some have even been known surreptitiously to withdraw their designs from the exhibition, in order to add improvements which have been suggested by the designs of another: nay, such is the total want of principle, and disregard of justice to the competitors, shown in some cases, that an instance could be brought forward where one of the competitors was appointed the judge! This competitor judge most naturally gave his decision in favour of his own designs, and the unsuccessful competitors were dismissed with the most cogent and satisfactory argument, that "the judge was a man of such respectability, that he would not have chosen his own design, unless he had considered it the best!" Is it possible to conceive that language could be so sophisticated as to apologise for such conduct? Thus it is that nine out of ten competitions are decided, and thus are the architects treated who have spent a large portion of their valua-

ble time for the benefit of the public. It must be acknowledged, however, that isolated cases occur, though few and far between, where no complaints of this nature can be made, and where fair play has been allowed to have had full scope. The Tron Church steeple, Edinburgh, erected, in 1828, by the architects Messrs. R. and R. Dickson, may be mentioned as an instance of fair competition; the choice of the plan reflects the highest credit upon the then magistrates of the city, who made their election from a great number of designs. Considering its cost, this steeple, for aptness, originality, and picturesque beauty, can scarcely be surpassed in any country. It would not be easy to cite many instances of the same kind in Scotland, but we may mention another, viz: Burns' monument at Ayr, by Thomas Hamilton, Esq., of Edinburgh. This is an exquisite gem of Grecian architecture, of which school its tasteful architect is a distinguished disciple. Finally, it is evident that the grievance here complained of, and which calls so loudly for redress, is in no way amenable to the civil law, unless in such a case as we have before hinted at, viz: where the judges do not abide by the advertised terms of the competition. Even in such cases, we are not sure how far they lay themselves open to have their proceedings legally called in question, so that an appeal can only be made to the moral rectitude of society; and we have no doubt that the evil only requires to be fairly exposed, to be, in time, totally eradicated.

Edinburgh, October, 1834.

¶ *Optical Delusion.*

It may not be uninteresting to the readers of your valuable journal, to be informed of a mechanical method which I have lately discovered, that enables the eye to distinguish objects when moving at great velocities.

Having conceived it probable that figures revolving on axes at right angles to their planes might be distinctly seen, I constructed an apparatus to determine the point, a short description and sketch of which I give you on the other side.

A drawing of Saturn and his belt, about five inches diameter, was then made, and caused to revolve at the rate of 2.500 times a minute, when the figure was found to be almost as distinctly visible as when at rest.

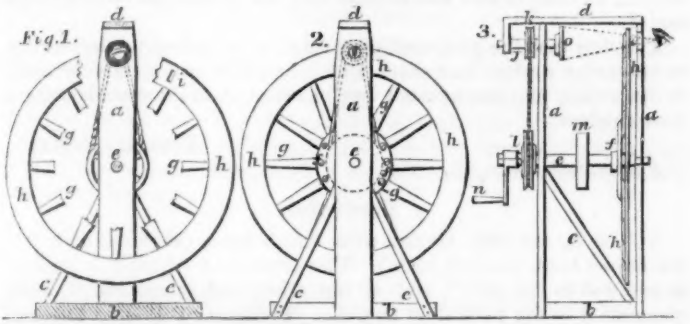
Other drawings were then tried, of a human figure, a toothed wheel, the number 1835, the letters R, R, &c., all of which were as distinguishable at that velocity as the first figure was.

It appears to me very likely, that the same results would be found if the velocity were increased to 10,000, or even 20,000, revolutions per minute. I am constructing another apparatus, founded on the same principle, which will enable me to put the correctness of this anticipation to the test of experiment.

RICHARD ROBERTS.

Manchester, Jan. 19, 1835.

Fig. 1, is an end elevation of the apparatus; fig. 2, is a sectional representation in the same direction; and fig. 3, is an elevation taken transversely; *a*, *a*, are two frame sides of wood, screwed to the base *b*, supported by the spur pieces *c*, *c*, *c*, and connected at top by the piece *d*. The main shaft, *e*, mounted in the standards, carries a cast iron disc, *f*, supported by twelve spokes, *g*, *g*, *g*, of wood, and to these spokes are nailed segments, *h*, *h*, of thin pasteboard.



In one of the segments a hole, *i*, is cut, one inch long by one and a quarter inch broad, and opposite to it another hole is made in the frame side, to which the spectator's eye is to be applied; *j*, is a small shaft, supported by one of the frame sides, and by a piece attached to *d*; and *k* is a pulley, two inches in diameter, to be driven by a band from the pulley *l*, of twelve inches diameter on the main shaft; *m* is a strap pulley, by which motion from any first mover may be communicated to the discs; *n* is a winch handle, of seven inches radius, by which 1000 or 1200 revolutions per minute may be given to the small disc, *o*, on the shaft, *j*, the centre of which is opposite to that of the eye-hole in the frame side. The small disc is of wood, and to it the figures to be viewed were attached. It will be evident that, if the large disc be set in motion, the small disc will be made to revolve at about six times the velocity of the large one; and as the centre of the eye-hole is about two feet two inches from the centre of the disc, the figure on the small disc will perform only the one hundred and ninth part of a revolution each time that it comes under the view, and will appear to be at rest.

Owing to the difficulty of making pulleys work with unvarying relation to each other, a kind of jumping appearance was produced, from a change of position in the figure; to obviate this, I used toothed wheels of six to one, instead of pulleys, and then the figure ceased to change its position. [*Lond. Journ.*

¶ *Compensating Pendulum.*

Annexed is a sketch of a compensating pendulum, the idea of which was suggested by the description of a lever pendulum, by Captain Forman, in your Magazine for last month.

The inconvenience of that proposed by Captain Forman, is apparent from a single glance; it is, in fact, of such a form, as to be rendered practically useless. The idea, however, of two bars of expansive powers in a duplicate ratio, acting upon a lever, to produce the effect required, is extremely ingenious; and availing myself of this hint, I proceeded to accomplish the same effect by means of *two levers*, so disposed that the form of the gridiron pendulum will obtain without its complicated mechanism, and the pendulum be practically useful.

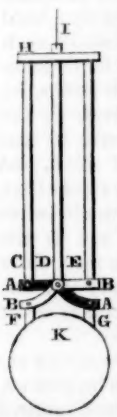
Trusting that the proposed plan may not be thought uninteresting, or unworthy a place in a work which has been so extensively useful to the artisan and mechanic, I beg to submit it to the consideration of your readers.

BENJAMIN HURLEY.

Portsmouth, Nov. 13, 1834.

Description.

A A, B B, are two levers, with equal arms, (in the sketch they are drawn bent, to show both.) The lever A A (shaded) is attached at one end to the rod C, and at the other end to the rod G, which connects it to the pendulum bob, K. The lever B B is, in like manner, attached to the rod E, and the connecting rod F. The pendulum rod, D, passes between the two levers at their centres, and a pin passing between all three, *i. e.*, the two levers, and the rod, connects them together, and thus fulcrums are formed for the levers. The pins in this case, as well as at the ends of the levers, should be fitted so as to admit of an easy motion upon them. The upper ends of the three rods are firmly fixed to the cross-bar A, and the pendulum swings in the usual way by the watch spring I.



The rods C and E are made of metal, composed of eight parts zinc, and one part tin. The rod D is made of steel, tempered; the whole of them are flat, about one-sixteenth of an inch thick, and brought to a knife edge. The expansion of the zinc rods are equal to 00269, that of the steel is equal to . . 00137; which is, as nearly as possible, in a duplicate ratio, and they may be made exactly so by hammering the zinc rods.

Assuming, then, that the expansive properties of the rods are in the exact proportion of 2 to 1, it will follow that, under any variation of temperature, the centre of oscillation of the pendulum will be unaltered, and a compensating pendulum be thus obtained, at much less trouble and expense than that of the gridiron pendulum, invented by Harrison.

I should recommend that the adjusting screws, for bringing the pendulum to the true time of vibration, should terminate in nuts, which may rest in a mortise cut quite through any part of the bob, such screws forming the termination of the rods F and G. This,

however, with other minutiæ as to the manner of finishing the joints of connexion, &c., may be safely left to the skill and ingenuity of any good workman, the principle alone requiring description.

[*Lond. Mech. Mag.*

¶ *The Bruges Stove, as improved by Messrs. Cottam and Hallen. By Mr.* Edward Cottam.

I send you sketches (figs. 1, 2, 3,) of the Bruges stove, as manufactured by Cottam and Hallen, who have found it to answer fully the statement given by them of it in your Encyclopedia of Architecture. It will do more with a given quantity of fuel than any other stove, having the means of stewing, boiling, broiling, roasting, and baking, at one and the same time, with a small quantity of coke or cinders from any other fire.

Fig. 1.

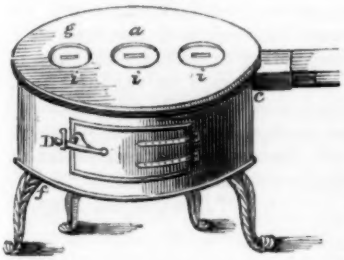
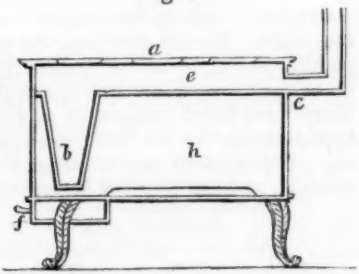
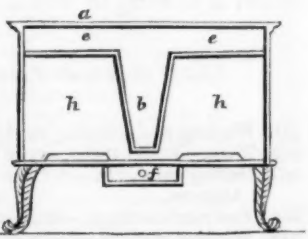


Fig. 2.



It is simple in form, and there is not the slightest difficulty in its use. The holes in the top may be arranged as is found most convenient for the situation in which the stove is to be placed, either in a line, as in the sketch, (fig. 1,) or in the form of a triangle. One thing is indispensable for the proper action of this stove, and that is, a good draught. It must, therefore, have a separate flue.

Fig. 3.



In fig. 1, 2, 3, *a* is the top of the stove; *b* is the fire pot; *g* is the hole for feeding the fire pot; *f* is an ash drawer; *c* is the flue: *d* is the oven door; *h* is the oven; *e* is a space for the fire to pass to the flue *c*, and for heating the whole of the top plate, any part of which will produce sufficient heat for culinary purposes; *i i i* have lids, which may be taken off, and the battery of stew-pans, or boilers, will then be in contact with the flame. A grid-iron fits on any of these openings, which has the advantage of not smoking the article broiled, the draught being downwards.

[*Loud. Arch. Mag.*

¶ *Spires.*

The spire of a church, which had deviated from the perpendicular 5 feet 11 inches, and was split several inches apart a long way up the centre, has lately been set straight, and reunited, by Mr. Trubshaw. The spire was built on a naturally sloping situation, and its weight is estimated at about 1500 tons of stone. In all sloping situations, the lower side (whether of churches, towers, houses, or even walls or roads, unless the foundation be rock,) has a tendency to give way first, but more especially when the foundation, as in this case, was of two different kinds of subsoil. On the upper or fast side of the spire, the ground underneath was of slaty marl, while that on the lower side of it was of a sandy marl. Mr. Trubshaw, after examining well the outside of the foundations, commenced digging down the inside. After having got below the level of the footings, (lowest stones of the foundation,) "he proceeded to bore a row of auger holes clear through under the foundation of the high side, the holes nearly touching each other. These holes he filled with water, and, corking them up with a piece of marl, let them rest for the night. In the morning, the water had softened the marl to a puddle, and the building gradually beginning to sink, another row of holes were bored, but not exactly so far through as the first row. They were filled with water as before, and the high side not only kept sinking, but the fracture in the centre kept gradually closing up. This process was continued till the steeple became perfectly straight, and the fracture imperceptible.—*Weekly Dispatch, April 7.*

[*Loud. Arch. Mag.*

¶ *Iron Castings.*

Mr. Avery, the proprietor of a large iron foundry in Syracuse, state of New York, has ascertained, by a series of experiments, that if common fine sand is mixed with common blue clay, in the proportion of one-tenth part of clay to nine-tenths of sand, it constitutes the best possible composition for casting that can be used. Even the most delicate castings come out perfectly free of sand, and require no sort of cleaning by vitriol.—*Brattleborough Independent.*

List of American Patents which issued in May, 1835.

		May
251.	*Washing and wringing machine.*—John Snyder, city of Philadelphia,	2
252.	*Truss.*—Philip Hittel, city of Philadelphia,	2
253.	*Cutting straw, &c.*—William Denson, Center Spring, Morgan county, Alabama,	2
254.	*Rail-road carriages.*—Heinrich Backmann, Lancaster, Pa.	2
255.	*Washing machine.*—Philo Hunt, Sharon, Litchfield county, Conn.	2
256.	*Bungs, cutting, &c.*—George D. Gates, Hartford, Conn.	2
257.	*Printing press.*—Josiah Warren, Warwick, Tuscarawas county, Ohio,	2
258.	*Propelling wheel.*—Thomas Pierce, Hartwick, Otsego county, N. Y.	2
259.	*Comb teeth, cutting.*—Lemuel Adams, Reading, Fairfield county, Conn.	2

		May
260.	*Hat bodies, stiffening.*—Henry Blynn, Newark, New Jersey,	9
261.	*Churn.*—Michael Knight, Pownal, Cumberland county, Maine,	9
262.	*Silk throwing and twisting.*—Lucilius H. Mosely, Poughkeepsie, N. Y.	9
263.	*Washing machine.*—Mitchell and Fairbanks, Readfield, Kennebec co., Maine,	9
264.	*Sifting grain, &c.*—Armstrong and King, city of New York,	9
265.	*Fleam for bleeding.*—Cornelius Addle, Winthrop, Kennebec county, Maine,	9
266.	*Washing machine.*—Jacob Sayer, Harrisonburg, Rockingham county, Virginia,	9
267.	*Cooking stove.*—Resor, Wade, and Resor, Cincinnati, Ohio,	9
268.	*Thrashing machine.*—Sneed and Carpenter, Charlottesville, Va.	9
269.	*Damask loom.*—Tompkins and Gilroy, North Providence, R. I.	9
270.	*Diving apparatus, &c.*—John W. Fraser, Boston, Mass.	9
271.	*Saddle seat spring.*—Baylis and Brannon, Fredericksburg, Virginia,	16
272.	*Stoves.*—Charles. W. Peckham, New Haven, Conn.	16
273.	*Hats and stocks stiffeners.*—Elisha Pratt, Cambridgeport, Mass.	16
274.	*Water wheel.*—William Merrell, Randolph, Portage county, Ohio,	16
275.	*Cotton seed, hulling, &c.*—James Martin, Petersburg, Virginia,	16
276.	*Evaporating for salt.*—Edward C. Cooper, city of New York,	16
277.	*Water wheel, reaction.*—John B. M'Cord, Galena, Illinois,	16
278.	*Carriages and wheels.*—Williams and Wing, Hartford, Conn.	16
279.	*Capstan.*—Calvin Oaks, city of New York,	16
280.	*Rovings, &c. making.*—James Jones, Manchester, Great Britain,	16
281.	*Thrashing machine.*—W. F. Pagett, Whiteport, Frederick co., Va.	22
282.	*Lath machine.*—David M. Cradit, Ithaca, New York,	22
283.	*Pump.*—Philo C. Curtis, Utica, New York,	22
284.	*Locomotive engines.*—Charles and G. E. Sellers, city of Philadelphia,	22
285.	*Stone sawing mills.*—Joseph L. Dutton, city of Philadelphia,	22
286.	*Boiler for kitchens.*—John and W. C. Baily, Farmington, Maine,	22
287.	*Paddle wheels.*—Benjamin M. Smith, Rochester, New York,	22
288.	*Flour cooler, &c.*—Hebart, Catlin, and Abeel, Pomfret, New York,	22
289.	*Oil, preventing absorption of.*—Nathaniel Hathaway, Fairhaven, Bristol county, Mass.	22
290.	*Lamp for volatile materials.*—George Eyles, Boston, Mass.	22
291.	*Washing machine.*—John T. Denniston, Alexander, Genessee county, New York,	22
292.	*Timepieces.*—William Pardee, Albany, New York,	22
293.	*Weighing scales.*—Elias A. and A. Hibberd, Lunenburg, Vermont,	29
294.	*Roller gin.*—William Whettemore, West Cambridge, Mass.	29
295.	*Steam engine.*—John Kirkpatrick, Baltimore, Md.	29
296.	*Cider mill, cast iron.*—Philip Pryer, Genessee, New York,	29
297.	*Churn.*—Philip L. Lowell, Farmington, Maine,	29
298.	*Thrashing machine.*—Edmund Warren, city of New York,	29
299.	*Excavating machine.*—Nathan Currier, Methuen, Essex county, Mass.	29
300.	*Furnaces for lime and ores.*—John Owings, Adams county, Pa.	29
301.	*Brick machine.*—William Tucker, Luray, Page county, Va.	29
302.	*Mortising machine.*—Ira Gay, Dunstable, Hillsborough co., N. H.	29
303.	*Hat block.*—A. and S. Chichester, Wilton, Fairfield county, Conn.	29
304.	*Planing sash staff.*—Ira Gay, Dunstable, Hillsborough county, N. H.	29
305.	*Odometer.*—J. Fuller, and A. A. Richardson, Brunswick, Maine,	29
306.	*Thrashing machine.*—Henry Johnson, Washington county, Tenn.	29
307.	*Straw cutter.*—Stephen Ustick, city of Philadelphia,	29
308.	*Cooking Stove.*—Hiram G. Phelps, Johnstown, New York,	29
309.	*Cooking stove.*—John C. Kolbe, city of Philadelphia,	29
310.	*Power gaining machine.*—Philo C. Curtis, Utica, New York,	29

CELESTIAL PHENOMENA, FOR AUGUST, 1835.

Calculated by S. C. Walker.

Day.	H'r.	Min.					
5	10	48	N. App.	☽ and ♂	Sagittarii,	,3,	☽ S. 0'.9
9	9	44	Im.	τ'	Aquarii,	,6,	N. 117° V. 76°
9	11	4	Em.				299° 269°
9	11	31	Im.	τ^2	Aquarii,	,5,6,	168° 141°
9	12	27	Em.				254° 239°
12	11	4	Im.	33	Ceti,	,6,	129° 91°
12	12	23	Em.				304° 261°
19	13	27	Im.	37	Gemini,	,6,	154° 107°
19	13	59	Em.				223° 176°

Meteorological Observations for April, 1835.

Moon.	Days.	Therm. Sun rise.	Therm. 2 P.M.	Barometer. Sun rise.	Barometer. 2 P.M.	Wind. Direction.	Wind. Force.	Water fallen in rain.	State of the weather, and Remarks.
				Inches.	Inches.			Inches.	
	1	42°	69°	29.70	29.75	W.	Moderate.		Hazy day.
	2	43	72	.75	.64	S.	do.		Clear—thunder & lightning.
	3	43	66	.60	.70	NE. S.	do.		Cloudy day.
	4	46	52	.65	.65	Variable.	do.	0.53	Cloudy—thunder and lightning.
	5	36	43	.30	.35	NE.	do.		Rain—thunder and lightning.
☾	6	49	43	.35	.35	W.	do.		Cloudy day.
	7	39	48	.35	.46	W.	Brisk.		Clear—flying clouds—rain.
	8	46	62	.65	.70	W.	Moderate.	0.46	Clear day.
	9	49	68	.70	.73	W.	Brisk.		Hazy day.
	10	54	77	.75	.80	NW.	Moderate.		Hazy day.
	11	47	65	.95	30.05	E. SE.	do.		Cloudy—lightly cloudy.
	12	39	66	30.10	.05	N.	do.		Hazy day.
	13	43	57	29.90	29.70	S. W.	do.		Cloudy—rain.
	14	35	40	.75	.76	W.	Blustering		Clear—flying clouds.
	15	28	50	30.00	.95	W.	Brisk.		Clear—snow in the night.
	16	32	47	29.90	.55	E. W.	Moderate.	0.48	Snow, ground covered.
	17	31	40	.75	.85	W.	Blustering		Lightly cloudy—snow squalls.
☽	18	30	43	30.10	30.23	NW.	Moderate.		Clear day.
	19	34	48	.15	.00	SE.	Variable.		Lightly cloudy.
	20	56	70	29.90	30.40	SW.	Brisk.		Cloudy—lightly cloudy.
	21	40	57	.90	.85	NW. SW.	do.		Clear day.
	22	43	60	.75	.70	Variable.	Moderate.		Clear—cloudy.
	23	37	53	.85	.90	W.	do.		Clear—cloudy.
	24	35	49	30.10	30.10	NW.	do.		Clear—frost—clear.
	25	41	49	29.90	29.80	SE.	do.	0.10	Cloudy; drizzle; thunder & light'g
	26	38	41	.75	.90	SE.	do.		Rain—cloudy.
	27	43	58	.95	.96	SE.	do.		Cloudy—rain in night.
⊗	28	37	49	.92	.45	NW.	Blustering	1.50	Rain—snow—flying clouds.
	29	45	69	.90	.83	W.	Moderate.		Cloudy—clear.
	30	53	68	.96	.80	E.	do.		Cloudy day.
	Mean	41.17	56.07	29.74	29.76			3.27	

Thermometer.		Barometer.
Maximum height during the month,	77. on 10th,	30.23 on 18th.
Minimum do.	28. on 15th.	29.22 on 28th.
Mean do.	48.62	29.75